2002

SOUTHWESTERN WILLOW FLYCATCHER STUDY RESULTS

Selected Sites Along the Rio Grande from Velarde, New Mexico, to the Headwaters of Elephant Butte Reservoir

Bureau of Reclamation
Technical Service Center
Ecological Planning and Assessment
Denver, Colorado

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Selected Sites Along the Rio Grande
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EXECUTIVE SUMMARY

Overview

During the summer of 2002, the U.S. Bureau of Reclamation (Reclamation) conducted surveys and nest monitoring of the federally endangered southwestern willow flycatcher (*Empidonax traillii extimus*) (WIFL) in six distinct reaches along approximately 110 miles of the Rio Grande River between Velarde, New Mexico, and Elephant Butte Reservoir. Surveys were performed to contribute to current baseline data of the WIFL along the Middle Rio Grande and also to meet Reclamation's Endangered Species Act (ESA) compliance commitments. There were 146 resident WIFLs documented in 84 territories forming 62 breeding pairs. As in previous years, the San Marcial and Sevilleta reaches were most productive, containing 63 and 13 territories, respectively, and the population as a whole in the Middle Rio Grande is expanding.

Nest monitoring was conducted at all sites where nesting pairs were detected. Eighty nests were monitored for success rates, productivity, and brown-headed cowbird (*Molothrus ater*) (BHCO) parasitism. The San Marcial reach proved most productive, producing 67 nests and fledging at least 86 WIFL young. The Sevilleta reach produced 13 nests and fledged 16 WIFL young. Overall, nest success decreased during 2002, primarily caused by an increase in predation rates. BHCO parasitism and nest productivity remained similar to previous years' data.

Other studies were initiated or continued in 2002. These include: (1) Breeding Biology Research and Monitoring Database nest monitoring study, (2) BHCO point counts, (3) livestock grazing study, and (4) WIFL habitat suitability assessment. These studies are designed to provide further insight into potential threats and habitat requirements of WIFL populations.

Survey Results

ESA Collaborative Program funded:

- -Velarde – 0 territories
- -Belen – 1 territory
- -Sevilleta/La Joya – 13 territories
- -San Acacia* – 4 territories
- -Bosque del Apache National Wildlife Refuge – 3 territories

Middle Rio Grande Program funded:

- -San Acacia* - 4 territories
- -San Marcial – 63 territories

*San Acacia reach funded in part by ESA Collaborative Group and in part by Reclamation

Recommendations

1. Continue annual surveying and nest monitoring within the San Marcial and Sevilleta/La Joya reaches to determine reproduction, nest success, recruitment and population trends of WIFLs within the Middle Rio Grande.
2. Give special attention to "core concentration area" between sites LF-17/17a and the Elephant Butte delta to document expansion of WIFLs into the Elephant Butte conservation pool.
3. Survey suitable/potential habitat in each reach (e.g. Velarde, Belen, San Acacia, Bosque del Apache NWR) every 2 to 3 years to document new occupation by resident WIFLs.
4. Continue nest monitoring and removal of BHCO eggs or chicks from parasitized WIFL nests in lieu of cowbird trapping.
5. Assess habitat features at nest sites and occupied patches—both at territory and macroscale level—to determine components characteristic of WIFL breeding areas where populations are expanding, remaining stable or becoming extirpated.

INTRODUCTION

The southwestern willow flycatcher (*Empidonax traillii extimus*) (WIFL) is an insectivorous, neotropical migrant that nests in dense riparian or wetland vegetation in the Southwestern United States (Figure 1). WIFLs generally arrive at their breeding grounds between early May and early June; by late July or August, they depart for wintering areas believed to be in Mexico, Central America, and possibly South America (Sogge et. al. 1997). They have been observed in Costa Rica during the winters of 1998-1999 and 1999-2000 (Sogge pers. comm. 2000).

Recent studies indicate that WIFL populations have declined across their range (60 FR 10694). The primary causes of declining populations are likely habitat loss or modification and brood parasitism by the brown-headed cowbird (*Molothrus ater*) (BHCO) (60 FR 10694). The U.S. Fish and Wildlife Service (USFWS) officially listed the southwestern willow flycatcher as an endangered species in February 1995 (60 FR 10694). The southwestern willow flycatcher is also listed as an endangered species or species of concern in New Mexico, Arizona, Utah, and California (Sogge et. al. 1997). A draft southwestern willow flycatcher recovery plan has been developed and is currently under review. To accompany the recovery plan, a series of issue papers associated with the recovery of the endangered WIFL has also been prepared by the Recovery Team. These papers address current issues and recommend management alternatives in regard to BHCO parasitism, livestock grazing, water management, exotic vegetation, habitat restoration, fire management, and recreational impacts.

Field surveys are conducted to determine the distribution and abundance of the endangered WIFL during the relatively brief breeding season when they become a seasonal resident of the Southwestern United States. U.S. Bureau of Reclamation (Reclamation) personnel have conducted presence/absence surveys and nest monitoring during the May to July survey season within the Rio Grande Basin since 1995. In 1994, the New Mexico Natural Heritage Program (NMNHP) conducted presence/absence surveys and nest monitoring within the San Marcial reach under a contract with Reclamation.

The 2002 presence/absence surveys for WIFLs were conducted at selected sites along the Rio Grande from Velarde, New Mexico, to the headwaters of Elephant Butte Reservoir (Figure 2). Surveys were completed between May 18 and July 28, 2002. Nest searches and nest monitoring of WIFL nests were conducted in conjunction with survey efforts by permitted biologists. In addition to conducting presence/absence surveys for the WIFL, surveyors were instructed to document occurrences of five additional avian species of special concern: yellow-billed cuckoo *(Coccyzus americanus)*, Bell's vireo *(Vireo bellii)*, yellow warbler *(Dendroica petechia)*, summer tanager (*Piranga rubra*), and common ground-dove (*Columbina passerina*).

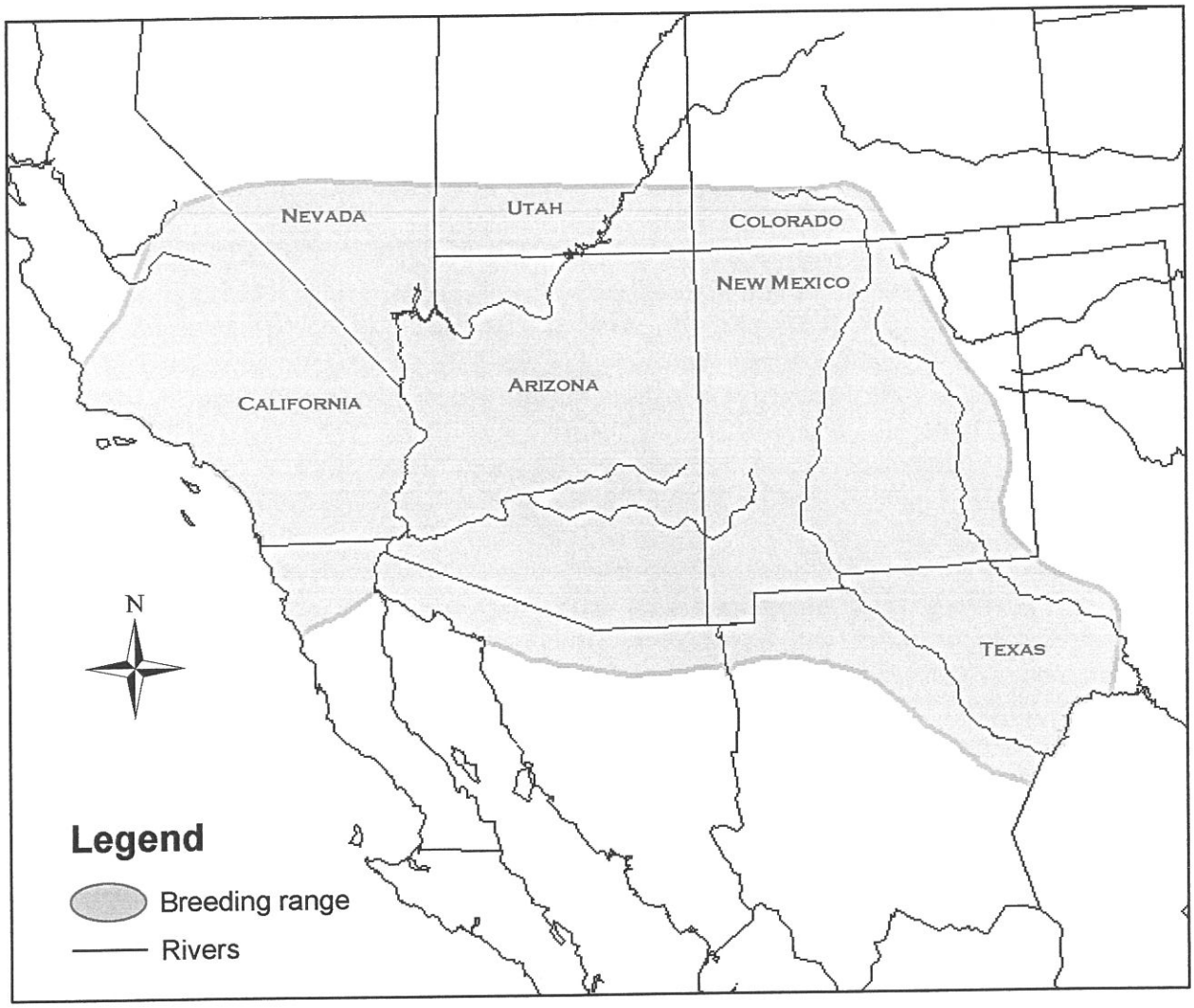

Figure 1. Breeding range of the willow flycatcher subspecies.

Figure 2. General locations of 2002 survey sites.

Goals and Objectives

Primary goals of the field studies performed in 2002 are:

1. Contribute to current baseline data regarding the population status, distribution, and habitat requirements of the WIFL in the Middle Rio Grande
2. Meet Reclamation's ESA compliance commitments for ongoing and proposed project and monitoring of completed projects.

Specific objectives include:

- Maintain project compliance for WIFL survey requirements.
- Determine baseline presence/absence information for previously unsurveyed habitats on Reclamation project lands.
- Monitor nests to determine reproductive status, population recruitment, and limiting factors.
- Assess nest site habitat characteristics.
- Provide initial assessment of general features of occupied habitat patches.
- Compare breeding success and parasitism rates between WIFL and other riparian-obligate neotropical migrant species.
- Document occurrences of other special status avian species within Reclamation project lands surveyed.
- Document occurrences of yellow-billed cuckoos in specific areas identified for proposed projects.

RELATED STUDIES

In addition to the presence/absence surveys and nest monitoring conducted in 2002, the following related studies were either previously conducted or continued in 2002:

- The BHCO trapping program within the San Marcial reach was discontinued in coordination with USFWS at the conclusion of the 2001 season. There were 4,739 BHCOs trapped during the 6-year trapping program (1996-2001) with 1,548 trapped during the resident period. The results of this program are discussed in detail in *Cowbird Control Program: Middle Rio Grande, New Mexico, 2001* (Ahlers and Sechrist 2002).

- Using a modified Breeding Biology Research and Monitoring Database (BBIRD) protocol, potential BHCO host nests were monitored to determine the effectiveness of the discontinued cowbird trapping effort and to gain a better understanding of the effects and intensity of factors such as brood parasitism and predation on productivity of riparian obligate species' nests. Parasitism levels, predation, nest success, and nest productivity of WIFLs and comparable riparian obligate species in various sites within the former trapping area were compared to those within two adjacent areas at least 12 kilometers (km) from the trapping area. Neither of the adjacent areas had been subject to BHCO trapping. One of the areas supported year-round grazing and the other did not support any livestock grazing. Preliminary results suggest that trapping may be an effective tool for reducing brood parasitism, however compensatory factors such as habitat, predation, and nest abandonment appear to offset for the increased success

due to decreased BHCO parasitism. Further information on this study can be found as a component of the *Cowbird Control Program: Middle Rio Grande, New Mexico, 2001* (Ahlers and Sechrist 2002).

- BHCO point counts were continued to determine the distribution and abundance of BHCO within the Middle Rio Grande Basin. Transects were established within four study areas to determine the distribution and density of BHCOs and to determine the effectiveness of the cowbird trapping program. Based on 1998 - 2002 data, the areas supporting the greatest mean number of BHCOs were within the Bosque del Apache National Wildlife Refuge (NWR) and Sevilleta NWR/La Joya State Wildlife Area—areas not subject to livestock grazing. Livestock grazing was present adjacent to each of these areas, however, based on telemetry data, cowbirds in this reach of the Rio Grande traveled less than 2 km on a daily basis between feeding and breeding areas (Ahlers and Sechrist 2000). The higher numbers of BHCOs could be a result of greater host densities and/or the availability of alternative food sources. Also, BHCO densities within the trapping area were less than that of another adjacent study area that has not been subject to cowbird trapping and supports year-round livestock grazing. The methods and results of this study can also be found as a component of the *Cowbird Control Program: Middle Rio Grande, New Mexico, 2001* (Ahlers and Sechrist 2002), and *Brown-headed Cowbird Movement and Home Range Analysis in the Middle Rio Grande, New Mexico 1999* (Ahlers and Sechrist 2000).

- A study to monitor and evaluate the impacts of livestock grazing on the establishment and development of riparian vegetation was also continued. This study was initiated in 1997 to determine the effects of seasonal livestock grazing on (1) the potential future habitat of the endangered WIFL and (2) physical disturbance to existing occupied habitats. Data from a series of established livestock exclosures, photo stations, and seasonal dietary analyses are currently being collected and processed. Study data are presented in: *Preliminary Report: Browsing Analysis of Riparian Vegetation, Elephant Butte Public Lands, Socorro, New Mexico, November 1997 to April 1999* (Ahlers 1999); and *Preliminary Report: Browsing Analysis of Riparian Vegetation, Elephant Butte Public Lands, Socorro, New Mexico, November 1999 Data Update* (Ahlers 2000).

- Development of a WIFL habitat suitability model was initiated in 1998 for the Middle Rio Grande, and continues to be refined based on changes in hydrology and updated vegetation maps. Riparian vegetation in the Middle Rio Grande between San Acacia Diversion Dam and Elephant Butte Reservoir had been classified using the Hink and Ohmart (1984) classification system through a cooperative effort with the U.S. Forest Service (USFS). This system identifies vegetation polygons based on dominant species and structure. Plant community types are classified according to the dominant and/or codominant species in the canopy and shrub layers. During the summer and fall of 2002, as part of the ESA Collaborative Program, Reclamation personnel updated vegetation maps from Belen to San Marcial using a combination of ground truthing and aerial photo analysis. These data are currently being processed and will be used to update the current WIFL habitat model.

For additional information on any of Reclamation's related studies, please contact Reclamation's Albuquerque Area Office, Albuquerque, New Mexico.

METHODS

Study Area

Survey sites were selected based on environmental compliance mandates related to Reclamation projects and an overall desire to obtain baseline data of WIFLs in the Middle Rio Grande Basin. The 2002 survey area encompassed selected sites along the Rio Grande between Velarde, New Mexico, and Elephant Butte Reservoir. This stretch contained six distinct survey reaches: Velarde, Belen, Sevilleta/La Joya, San Acacia to Bosque NWR, Bosque del Apache, and San Marcial. Eight sites (VL-01 to VL-08) within the Velarde reach were each surveyed three times due to their habitat characteristics and previous WIFL occupancy (Figure 3). The Belen reach was surveyed in entirety from the southern boundary of the Isleta Pueblo to Highway 60 (Figure 4). It was broken into 31 sites (BL-01 to BL-31) and surveyed 3 times. This was the first time these sites were surveyed for WIFLs. The 14 sites comprising the Sevilleta/La Joya reach (SV-01 to SV-14) (Figure 5) were surveyed three times, with the exception of site SV-08, which was not surveyed due to landowner issues. The San Acacia reach (Figure 6) contained 20 sites (LF-01 to LF-08, LF-38 to LF-45, LF-33 and LF-34) that were surveyed either three times(LF-03 to LF-08, LF-42 to LF-45, LF-33 and LF-34) or five times(LF-01, LF-02, and LF-38 to LF-41), depending on Reclamation project involvement. The Bosque del Apache reach (Figure 7) contained 11 sites (BA-01 to BA-08). Based on survey protocol, sites BA-05 to BA-08 were surveyed three times. Sites BA-01 to BA-04 North were involved in upcoming modifications and were surveyed five times. Lastly, due to complexity and structure of habitat, sites within the San Marcial reach (Figure 8) were typically smaller than sites to the north. Thirty-three sites (LF-09 to LF-19, LF-21, LF-22, LFCC-1 to LFCC-7, DL-01 to DL-03, DL-East, and DL-West) were each surveyed a minimum of five times.

Presence/Absence Surveys

All sites were surveyed in accordance with Sogge et al. (1997) and the USFWS revised protocol (USFWS 2000), using the repeated tape-playback method. Surveys were conducted a minimum of 5 days apart, generally between 0530 and 1100 by trained and permitted personnel. Survey forms were completed daily for each respective site. Survey dates are summarized in Table 1.

The first survey was conducted in late May to early June to increase the likelihood of detection, since territorial males are more vocal when establishing territories than after nesting has begun. It was anticipated that migrant WIFLs would also be detected. The second and third surveys were conducted between early June and early July to (1) confirm the establishment of territories and/or nesting, (2) detect late settling males, and (3) determine which sites remained occupied throughout the breeding season. The fourth and fifth surveys, conducted during mid-July, were initiated in 2002 to derive a greater degree of confidence regarding the breeding status, habitat association, or presence/absence of WIFLs at the selected sites. WIFLs documented on or after June 10 were considered resident birds. Each site was surveyed as thoroughly as conditions would allow. Most sites surveyed during the 2002 season were generally accessible with dry conditions occurring

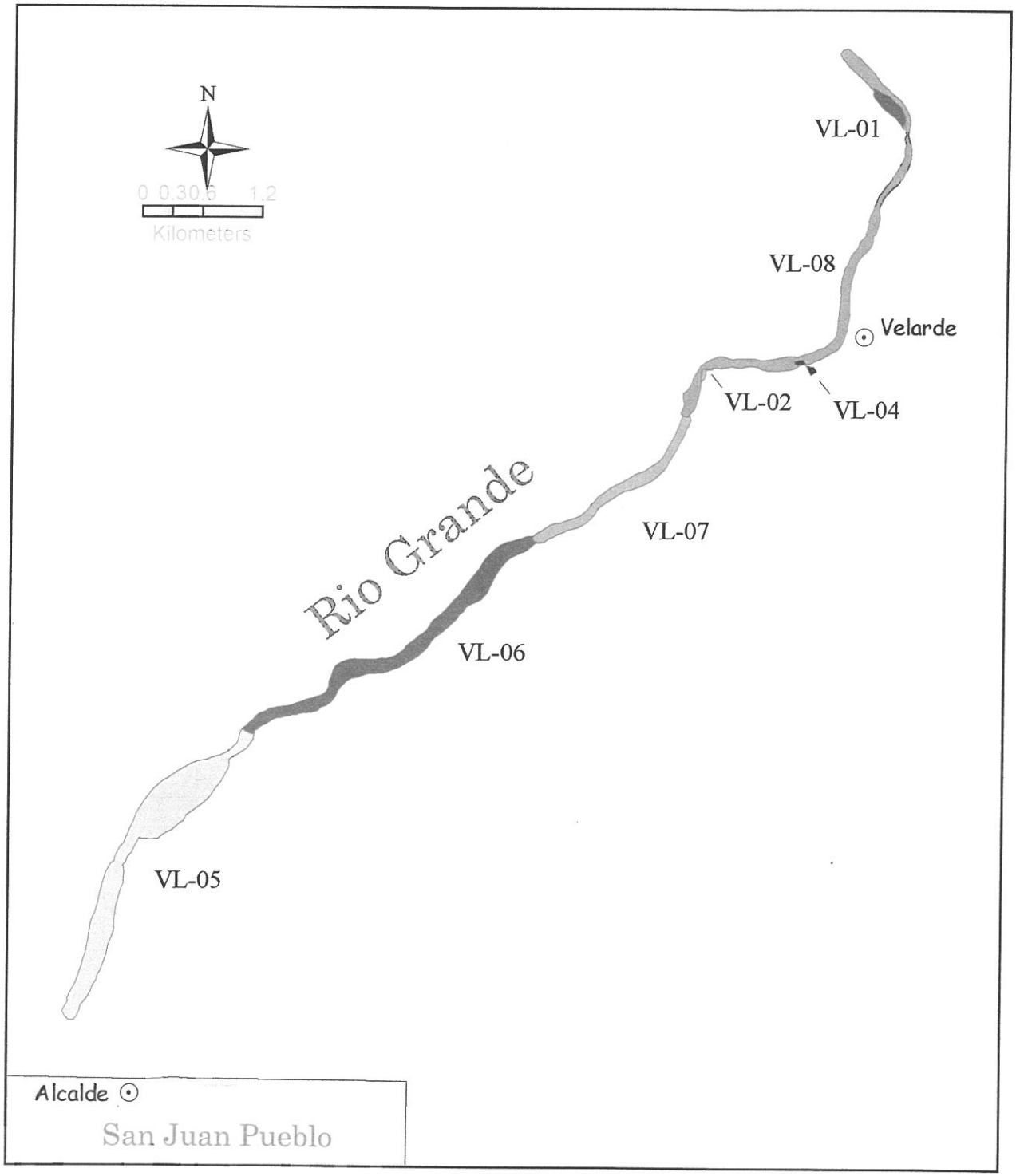

Figure 3. Overview of Velarde survey sites.

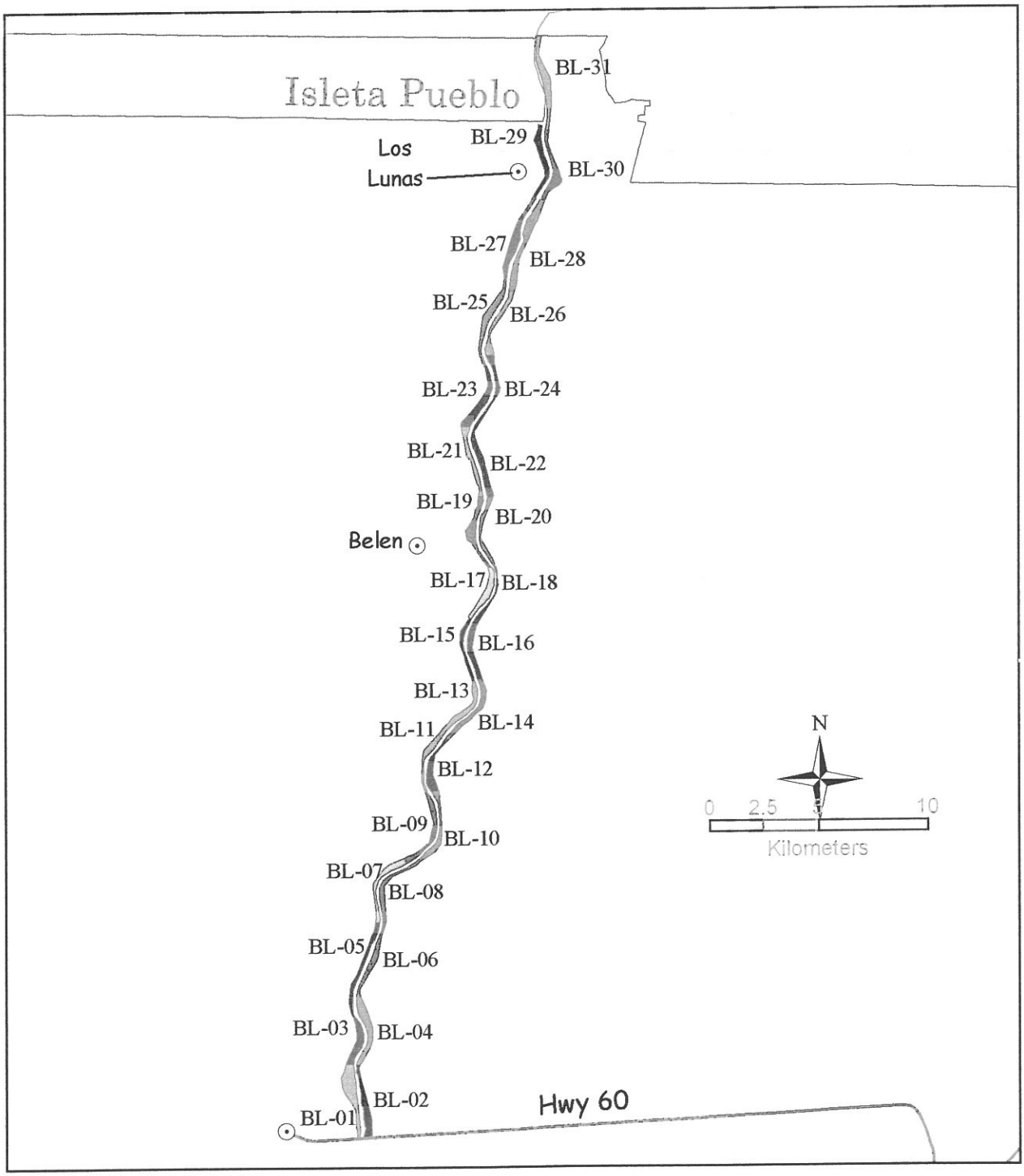

Figure 4. Overview of Belen survey sites.

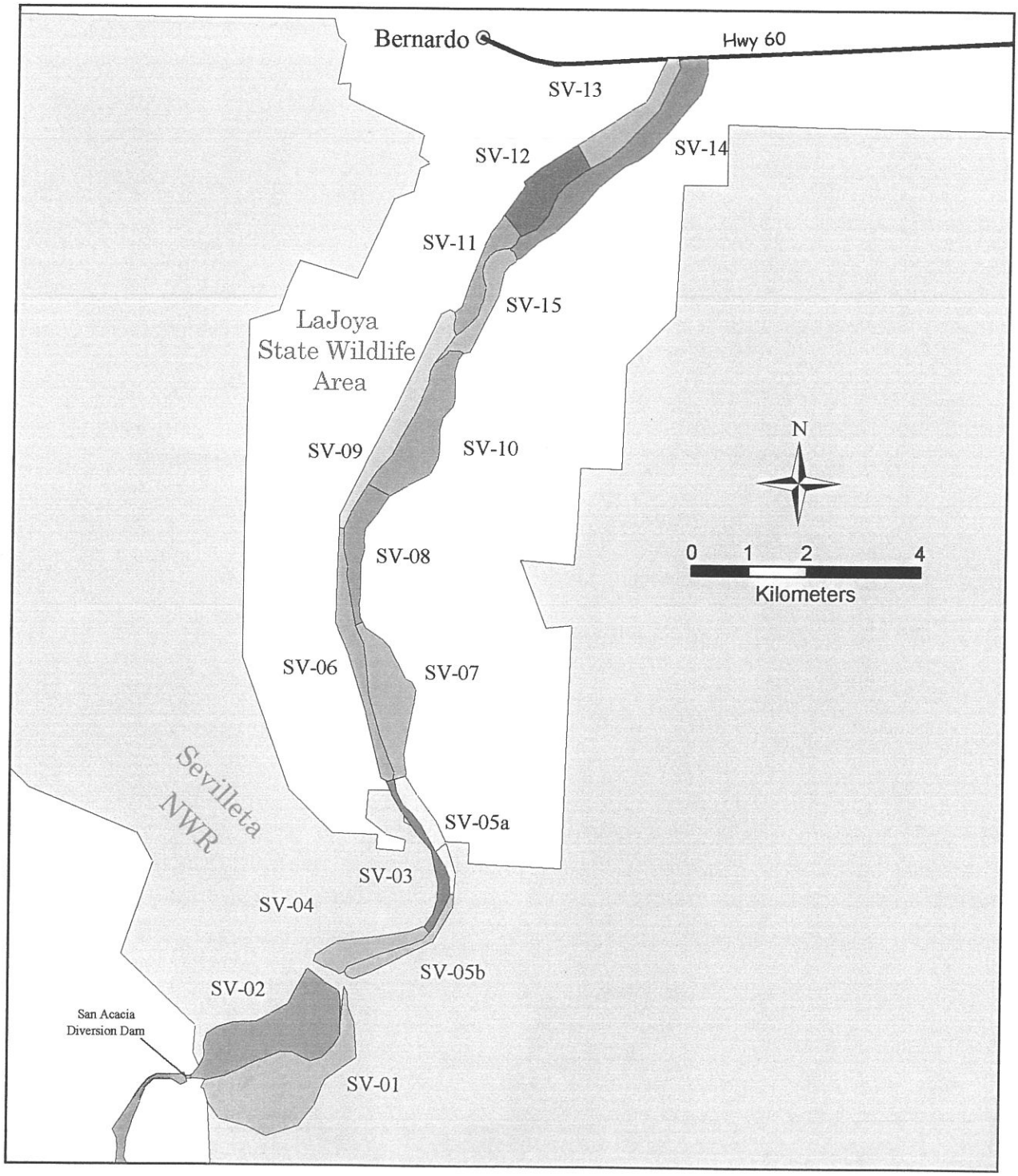

Figure 5. Overview of Sevilleta/ La Joya survey sites.

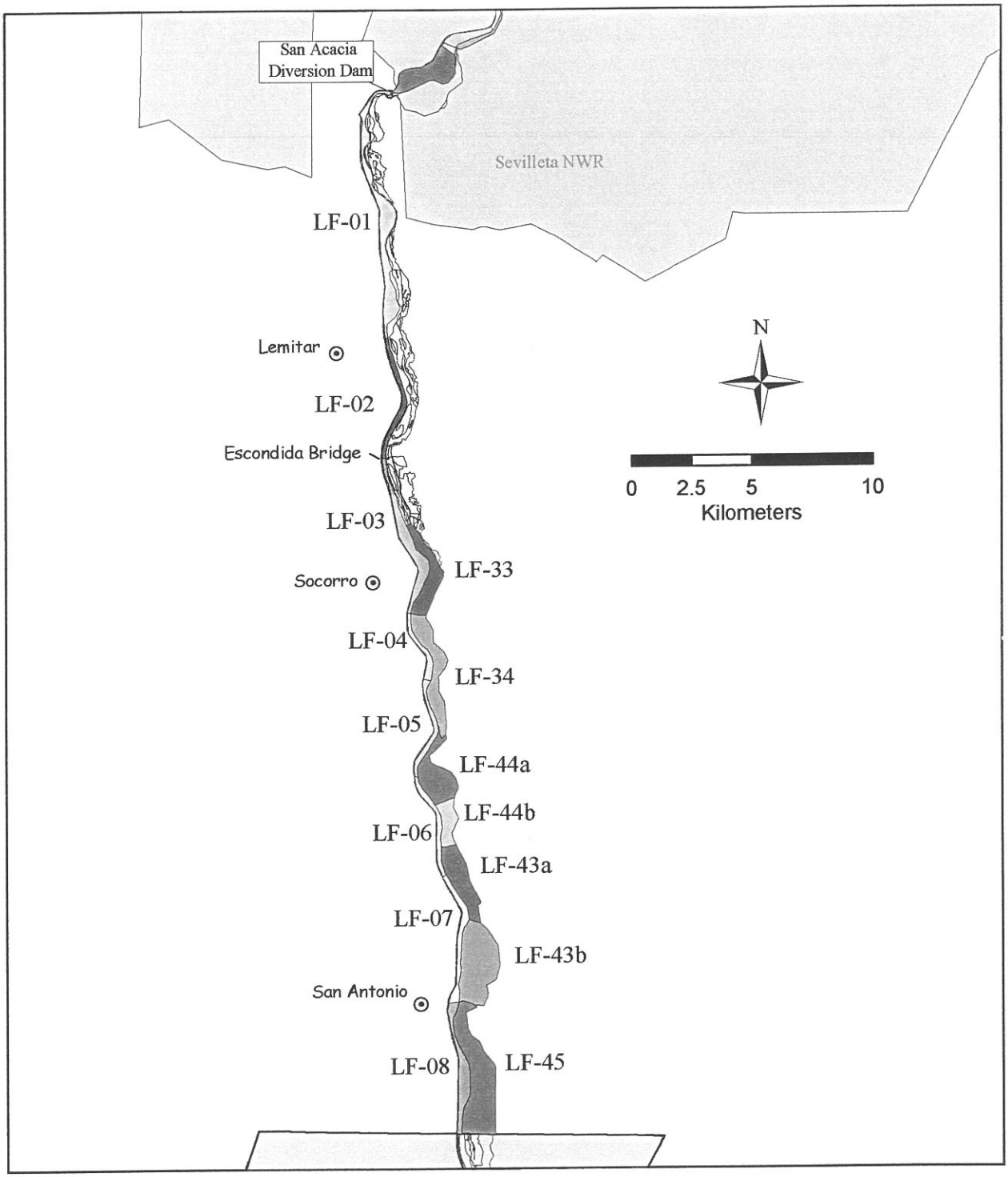

Figure 6. Overview of San Acacia survey sites.

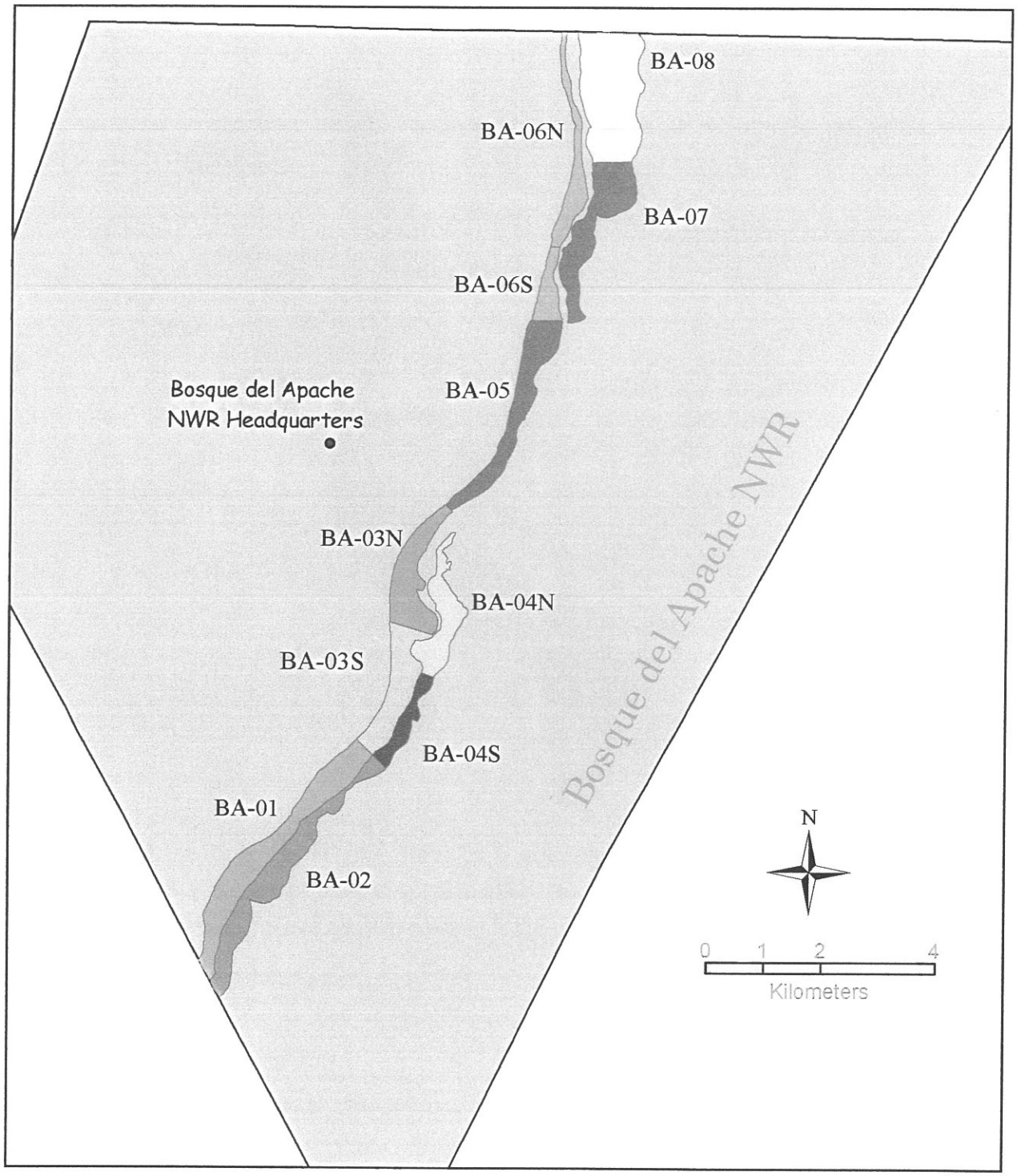

Figure 7. Overview of Bosque del Apache survey sites.

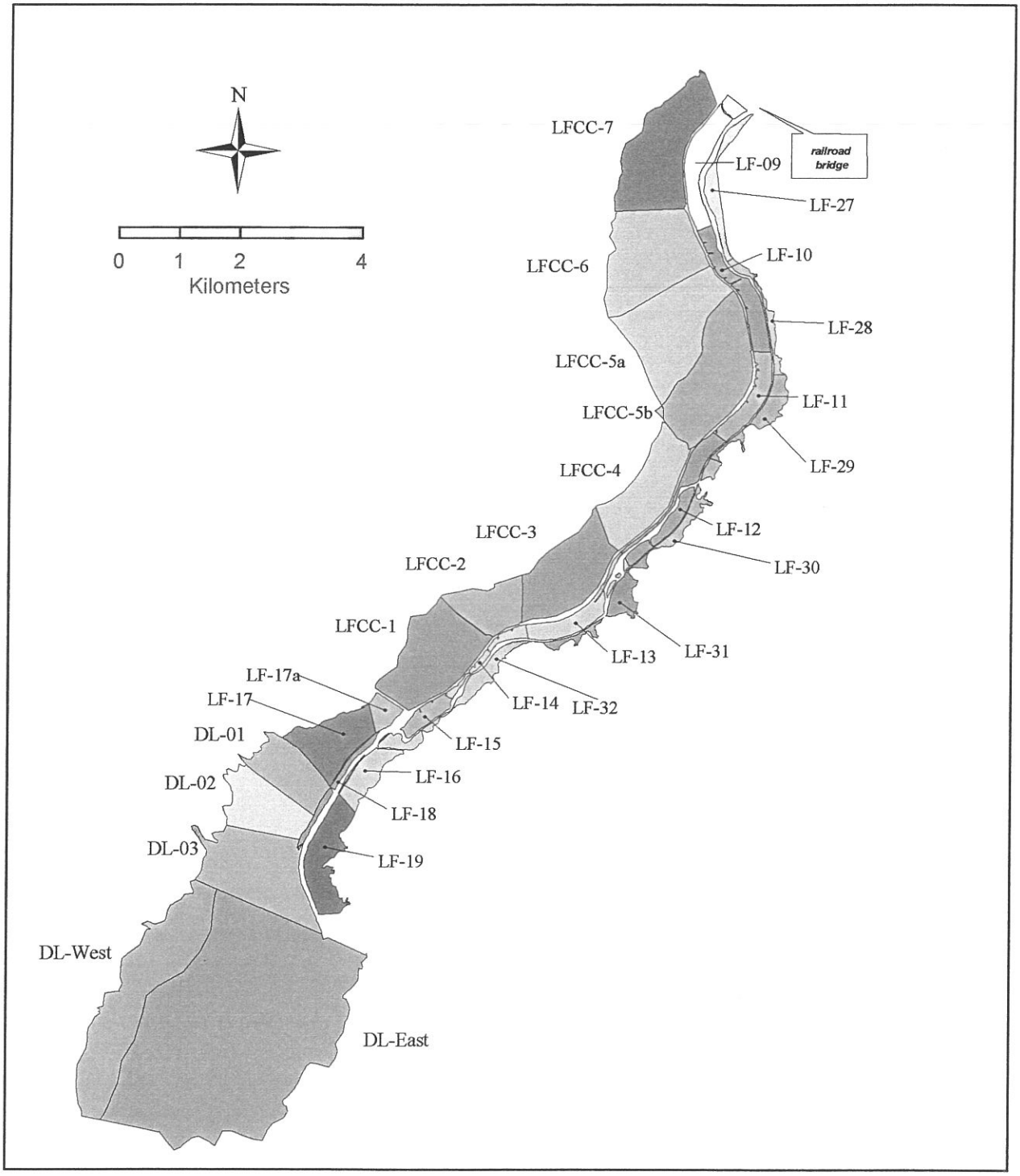

Figure 8. Overview of San Marcial survey sites.

Table 1. WIFL survey schedule for the 2002 field season

Survey number	Survey period
1	May 18 – June 7
2	June 8 - June 21
3	June 22 – July 3
4	July 4 - July 16
5	July 17 - July 27

during most surveys. Several of the southern sites within the San Marcial reach were subject to flooding during the 2002 breeding season, making surveys more difficult.

At the conclusion of a survey, the survey form was filled out. When WIFLs were detected, UTM coordinates were obtained, and the senior onsite biologist was notified. If pairing was confirmed or suspected, a permitted biologist initiated a nest search.

Species of Special Concern

Surveyors were also instructed to document the occurrence of other avian species of special concern within survey sites. These species included the yellow-billed cuckoo, Bell's vireo, yellow warbler, summer tanager, and common ground-dove. Every effort was made to avoid duplicate recording of these individuals, and individuals that were recorded multiple times were sorted out during processing of these data. When an individual was detected by either sight or sound, UTM coordinates were obtained, and a Species of Special Concern form was completed.

Nest Searches/Monitoring

Nest searches were conducted upon discovery of a breeding or suspected WIFL pair by a permitted biologist and technicians under the direct supervision of a permitted biologist,. To minimize disturbance and maximize accuracy of monitoring efforts, nest searches and monitoring were conducted using methods outlined in Martin and Geupel (1993) and the Southwestern Willow Flycatcher Nest Monitoring Protocol (Rourke et al. 1999). The nest area was located by observing diagnostic WIFL breeding behavior and listening for calls within the habitat patch. Once located, the nest site was approached cautiously, with minimum disturbance to vegetation. Typically, adult

WIFLs did not immediately reveal the nest locations. All suitable midstory trees and shrubs in the suspected area were carefully inspected until the characteristic small, cup-shaped nest described in Tibbitts et al. (1994) was found. Nests were usually located within a few minutes.

At all nest sites, physical data required by the Willow Flycatcher Nest Site Data Form were collected. Nest contents were not examined during the nest building/egg laying stages—the period when disturbance is most likely to cause adults to abandon the nest—or as the supposed fledging date approached when nestlings are likely to be force fledged. Nests with eggs/young were examined quickly using a mirror mounted on a telescoping pole. Nesting chronology was subsequently estimated following the initial search and examination. Subsequent visits were minimized and timed so at least one inspection would be made of eggs and nestlings, and pertinent data were recorded on the Willow Flycatcher Nest Record Form.

Lastly, in 2002, the practice of removing BHCO eggs from parasitized nests when possible was initiated. BHCO eggs were removed as quickly and carefully as possible to prevent disturbance to the nest. WIFL eggs were never disturbed and time spent at the nest was minimized. Eggs were removed using a piece of double-sided tape attached to a mirror pole or stick.

RESULTS

Presence/Absence Surveys

Presence/absence surveys were conducted from May 18 through July 28, and 268 WIFLs were documented (206 males and 62 females). Based on detections prior to June 10 and/or the birds' lack of territorial behavior, 122 are believed to have been migrants. The remaining 146 (84 males and 62 females) were believed to be resident WIFLs.

The 146 WIFLs established 84 territories and 62 pairs. Fifty-eight of the pairs were confirmed by documented nesting attempts; they produced 80 nests. Four additional pairs were observed and although nesting was suspected, it could not be confirmed in any of these territories. Of the 80 confirmed nesting attempts, 44 were believed successful and 36 failed. Successful nests include those which supported chick(s) 8 to 10 days old on the last nest visit, however, two nests that were not monitored into the late nestling stage were considered likely to have fledged young, and were thus included in the successful nest count. These nests contained nestlings age 4 and 7 days old, respectively, on the last visit of the season.

Detection results for 2002 are summarized in Table 2. Figure 9 maps WIFL detections within the Velarde reach, Figure 10 maps detections in the Belen reach, Figure 11 illustrates WIFL detections within the Sevilleta/La Joya reach, Figure 12 displays detections within the San Acacia to Bosque del Apache NWR reach, Figure 13 shows WIFL detections within the Bosque del Apache NWR reach, and Figure 14 shows WIFL detections within the San Marcial reach.

Table 2. Summary of WIFL detections – Middle Rio Grande – 2002

Site Name	Number of WIFLs observed[1]	Estimated number of pairs	Estimated number of *E. t. extimus*[2]	Estimated number of territories	Nest found[3]	Nest success	Comments
VL-05	1 (♂)	0	0	0	N/A	N/A	WIFL found on 6/5 and never found again, assumed to be migrant.
VL-06	1 (♂)	0	0	0	N/A	N/A	WIFL found on 6/6 and never found again, assumed to be migrant
Subtotal Velarde sites	2 (2♂)	0	0	0	N/A	N/A	Includes sites in Velarde area
BL-03	2 (♂)	0	1 (♂)	1	N/A	N/A	One bird assumed to be migrant. Second bird assumed to be lone male with no pairing activity.
BL-05	1 (♂)	0	0	0	N/A	N/A	Assumed to be migrant.
BL-07	1 (♂)	0	0	0	N/A	N/A	Assumed to be migrant.
BL-11	1 (♂)	0	0	0	N/A	N/A	Assumed to be migrant.
BL-13	1 (♂)	0	0	0	N/A	N/A	Assumed to be migrant.
BL-15	2 (♂)	0	0	0	N/A	N/A	Assumed to be migrant.
BL-21	1 (♂)	0	0	0	N/A	N/A	Assumed to be migrant.
Subtotal Belen sites	9 (♂)	0	1 (♂)	1	N/A	N/A	8 migrant WIFLs, 1 unpaired male WIFL (site BL-03).
SV-01	3 (3♂)	0	0	0	N/A	N/A	All assumed to be migrants.
SV-02	1 (♂)	0	0	0	N/A	N/A	Assumed to be migrant.
SV-03	14 (8♂, 6♀)	6	12 (6♂, 6♀)	6	Yes (8) [which includes two re-nests]	Successful (5) Failed (3)	Two migrants documented during first survey. All territories contained pairs with nests. Four nests had fledglings documented and one was assumed to have fledged WIFLs. Two nests were predated resulting in 2 re-nests. One nest was parasitized (2 WIFL eggs ejected from nest) and subsequently abandoned.

Site Name	Number of WIFLs observed[1]	Estimated number of pairs	Estimated number of *E. t. extimus*[2]	Estimated number of territories	Nest found[3]	Nest success	Comments
SV-09	10 (6♂, 4♀)	4	10 (6♂, 4♀)	6	Yes (5) [which includes one re-nest]	Successful (3) Failed (2)	Two of 6 territories contained unpaired males. WIFL fledglings documented for one nest. Two other nests assumed to have fledged. Two nests predated resulting in one re-nest. Two nests were parasitized. One was subsequently predated and the other fledged after removal of the BHCO egg.
SV-12	2 (2♂)	0	0	0	N/A	N/A	Assumed to be migrants.
SV-13	1 (♂)	0	0	0	N/A	N/A	Assumed to be migrant.
SV-14	1 (♂)	0	1 (♂)	1	N/A	N/A	Bird documented on 6/11 and then never again, assumed to be migrant although found during resident period and considered resident.
Subtotal La Joya/ Sevilleta sites	32 (22♂, 10♀)	10	23 (13♂, 10♀)	13	Yes (13) [which includes 3 re-nests]	Successful (8) Failed (5)	Includes all sites between the San Acacia Diversion Dam and Highway 60.
LF-01	1 (♂)	0	0	0	N/A	N/A	Assumed to be migrant.
LF-02	1 (♂)	0	0	0	N/A	N/A	Assumed to be migrant.
LF-03	1 (♂)	0	0	0	N/A	N/A	Assumed to be migrant.
LF-04	6 (6♂)	0	1 (♂)	1	N/A	N/A	One resident unpaired male, others assumed to be migrants.
LF-05	1 (♂)	0	0	0	N/A	N/A	Assumed to be migrant.
LF-07	4 (4♂)	0	0	0	N/A	N/A	All assumed to be migrants.
LF-08	7 (7♂)	0	1 (♂)	1	N/A	N/A	One resident unpaired male, others assumed to be migrants.
LF-33	3 (3♂)	0	1 (♂)	1	N/A	N/A	Two birds assumed to be migrants; third male found on 6/17 was treated as a lone, territorial male although only found on 6/17 so likely a migrant also.
LF-34	2 (2♂)	0	0	0	N/A	N/A	Both assumed to be migrants.
LF-38	6 (6♂)	0	0	0	N/A	N/A	All assumed to be migrants.
LF-40	12 (12♂)	0	0	0	N/A	N/A	All assumed to be migrants; none found later than 6/3.

Site Name	Number of WIFLs observed[1]	Estimated number of pairs	Estimated number of *E. t. extimus*[2]	Estimated number of territories	Nest found[3]	Nest success	Comments
LF-41	8 (8♂)	0	0	0	N/A	N/A	All assumed to be migrants; none found later than 6/3.
LF-43a	11 (11♂)	0	1 (♂)	1	N/A	N/A	One resident unpaired male (found on 6/28, gone on 7/4 and subsequent nest search), all others assumed to be migrants.
LF-43b	4 (4♂)	0	0	0	N/A	N/A	All assumed to be migrants.
LF-44b	1 (♂)	0	0	0	N/A	N/A	Assumed to be migrant.
LF-45	2 (2♂)	0	0	0	N/A	N/A	Both assumed to be migrants.
Subtotal San Acacia to Bosque NWR	70 (70♂)	0	4 (4♂)	4	N/A	N/A	All sites between San Acacia Diversion Dam and north boundary of Bosque del Apache NWR; no pairs or nesting found in any sites; only birds exhibiting territorial behavior.
BA-02	2 (2♂)	0	0	0	N/A	N/A	Both assumed to be migrants.
BA-03North	2 (2♂)	0	0	0	N/A	N/A	Both assumed to be migrants.
BA-03South	2 (2♂)	0	0	0	N/A	N/A	Both assumed to be migrants.
BA-04South	3 (3♂)	0	0	0	N/A	N/A	All assumed to be migrants.
BA-06North	6 (6♂)	0	3 (♂)	3	N/A	N/A	Three assumed to be migrants; others recorded as unpaired territorial males.
BA-08	5 (5♂)	0	0	0	N/A	N/A	All assumed to be migrants.
Subtotal Bosque sites	20 (20♂)	0	3 (3♂)	3	N/A	N/A	Surveys of selected sites within the Bosque del Apache NWR, no pairs or nesting found in any site.
LF-09	1 (♂)	0	0	0	N/A	N/A	Assumed to be migrant.
LF-11	1 (♂)	0	0	0	N/A	N/A	Assumed to be migrant.
LF-12	4 (3♂, 1♀)	1	3 (2♂, 1♀)	2	No	N/A	One bird assumed to be a migrant; male and female constituted a pair that didn't produce a nest; and an unpaired male (only documented on 6/26) was found.
LF-13	1 (♂)	0	0	0	N/A	N/A	Assumed to be migrant.
LF-14	4 (3♂, 1♀)	1	4 (3♂, 1♀)	3	Yes (1)	Successful (1)	Pair produced one nest that was assumed to have fledged; remaining two males were unpaired.

Site Name	Number of WIFLs observed[1]	Estimated number of pairs	Estimated number of *E. t. extimus*[2]	Estimated number of territories	Nest found[3]	Nest success	Comments
LF-16	2 (1♂,1♀)	1	2 (1♂, 1♀)	1	No	N/A	No nesting activity observed. The birds were not found again after the 6/12 survey and were likely late migrants.
LF-17	46 (24♂, 22♀)	22	46 (24♂, 22♀)	24	Yes (32) [Which includes 6 2nd broods and 5 re-nests]	Successful (21) Failed (11)	Confirmed fledglings from 4 nests, assumed fledging for 17 nests; 8 nests (5 1st broods, 2 2nd broods, and 1 re-nest) failed due to predation; 1 re-nest was abandoned prior to egg-laying; 1 re-nest containing a 3-day-old chick was abandoned; 1 nest failed due to unknown reasons. Two nests were parasitized (BHCO eggs removed from both, 1 fledged, 1 predated).
LF-17a	18 (9♂, 9♀)	9	18 (9♂, 9♀)	9	Yes (12) [Which includes 3 re-nests]	Successful (3) Failed (9)	Confirmed fledglings from 2 nests, assumed fledging from 1 nest; 9 nests failed (6 due to predation, 2 removed from nest tree by unknown means, 1 was abandoned after parasitism) leading to 3 re-nests. Seven nests were parasitized. Of these, BHCO eggs were removed from 4 (3 subsequently predated, 1 fledged), 2 were predated soon after parasitism, and 1 was abandoned.
LF-18	1 (♂)	0	1 (♂)	1	N/A	N/A	No pairing activity discovered, bird only documented on 6/24 survey.
LF-21	3 (2♂, 1♀)	1	3 (2♂, 1♀)	2	No	N/A	One pair and one unpaired male documented. No nesting documented.
LF-22	2 (1♂, 1♀)	1	2 (1♂, 1♀)	1	Yes (1)	Failed (1)	Pair produced one nest that was parasitized (BHCO egg removed) and subsequently predated. No re-nesting occurred.
LF-31	2 (2♂)	0	1 (♂)	1	N/A	N/A	One bird assumed to be migrant; the bird documented on 6/12 was treated as a lone male, although likely a migrant also.
LFCC-2	1 (♂)	0	1 (♂)	1	N/A	N/A	Treated as a lone male, although only documented on 6/13 survey, likely to be a late migrant.

Site Name	Number of WIFLs observed[1]	Estimated number of pairs	Estimated number of *E. t. extimus*[2]	Estimated number of territories	Nest found[3]	Nest success	Comments
LFCC-3	2 (2♂)	0	2 (♂)	2	N/A	N/A	Both treated as lone males, although found only on 6/13 survey, likely late migrants.
LFCC-4	3 (3♂)	0	0	0	N/A	N/A	All assumed to be migrants.
LFCC-5b	6 (6♂)	0	0	0	N/A	N/A	All assumed to be migrants.
LFCC-7	4 (4♂)	0	0	0	N/A	N/A	All assumed to be migrants.
DL-01	2 (1♂, 1♀)	1	2 (1♂, 1♀)	1	Yes (1)	Successful (1)	Fledglings confirmed for nest. Nest not parasitized.
DL-02	12 (6♂, 6♀)	6	12 (6♂, 6♀)	6	Yes (7) [Which includes 1 re-nest]	Successful (5) Failed (2)	Of the 7 nests, the re-nest and three others were assumed to have successfully fledged. Fledglings were confirmed for one nest. One nest was predated and one nest had eggs that never hatched and was eventually abandoned. One nest was parasitized and the BHCO egg was built over.
DL-03	18 (10♂, 8♀)	8	16 (8♂, 8♀)	8	Yes (12) [Which includes 5 re-nests]	Successful (5) Failed (7)	Two WIFLs assumed to be migrants. Of the 8 pairs, 7 produced nests. Fledglings were confirmed for one nest, four nests were assumed to successfully fledge young. Seven nests failed producing 5 re-nests. Of those that failed, 3 were predated, 1 was removed from nest tree by unknown means, 1 was abandoned after partial predation, and 2 were abandoned prior to egg laying. None of the nests were parasitized.
DL-West	2 (1♂, 1♀)	1	2 (1♂, 1♀)	1	Yes (1)	Failed (1)	Pair documented produced one nest that was predated after one egg was laid. No parasitism or re-nesting occurred.

Site Name	Number of WIFLs observed[1]	Estimated number of pairs	Estimated number of *E. t. extimus*[2]	Estimated number of territories	Nest found[3]	Nest success	Comments
Subtotal San Marcial sites [(4)]	135 (83♂, 52♀)	52	115 (63♂, 52♀)	63	Yes (67) [Which includes 6 2nd broods and 14 re-nests]	Successful (36) Failed (31)	Includes all sites between the railroad bridge and the headwaters of Elephant Butte Reservoir plus sites LF-21 and LF-22 (on the west side of the Rio Grande just south of the Bosque NWR).
Totals	268 (206♂, 62♀	62	146 (84♂, 62♀)	84	Yes (80) [Which includes 6 2nd broods and 17 re-nests]	Successful (44) Failed (36)	

(1) When a single WIFL responded to the tape playback, and there was no evidence of pairing, it was considered to be a lone male. However, it is possible that some of the WIFLs counted as males may have been females, especially during the migrant period.

(2) A documented WIFL was considered to be a resident *Empidonax traillii extimus* if it was documented on or after June 10 or nesting activity could be confirmed

(3) A second brood occurs after a WIFL pair has had a successful nesting attempt (i.e., young are fledged). A re-nest commonly occurs after an unsuccessful first nesting attempt.

(4) The San Marcial reach extends from the south boundary of the Bosque del Apache NWR to the headwaters of Elephant Butte Reservoir. However, sites between the railroad bridge and the southern boundary of the Bosque NWR were not surveyed for the fifth consecutive year (with the exception of sites LF-21 and LF-22). Habitat in these unsurveyed sites holds potential for inhabitation by resident WIFLs. These potential territories are not included in the San Marcial or total counts.

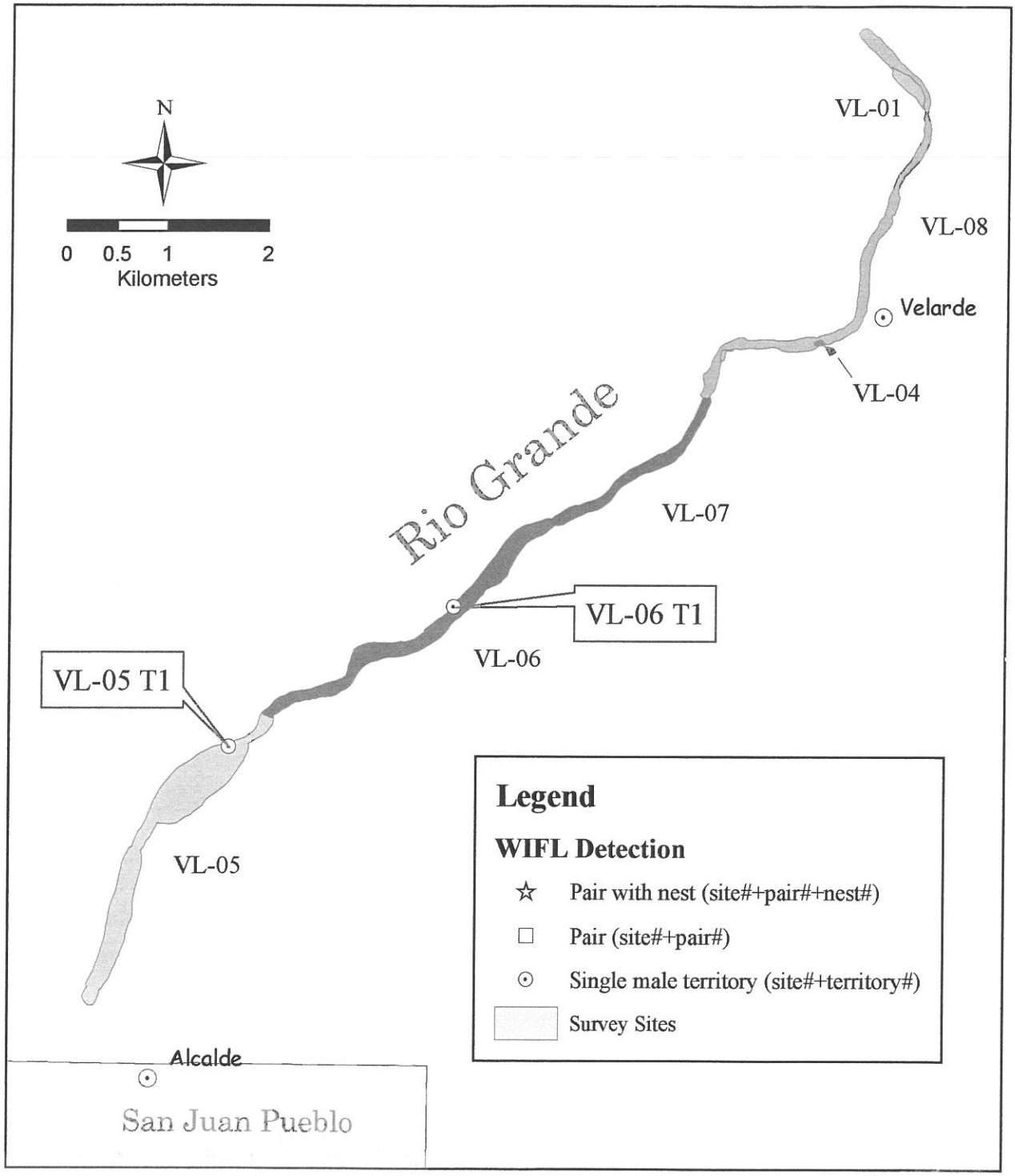

Figure 9. WIFL detections within the Velarde reach – 2002.

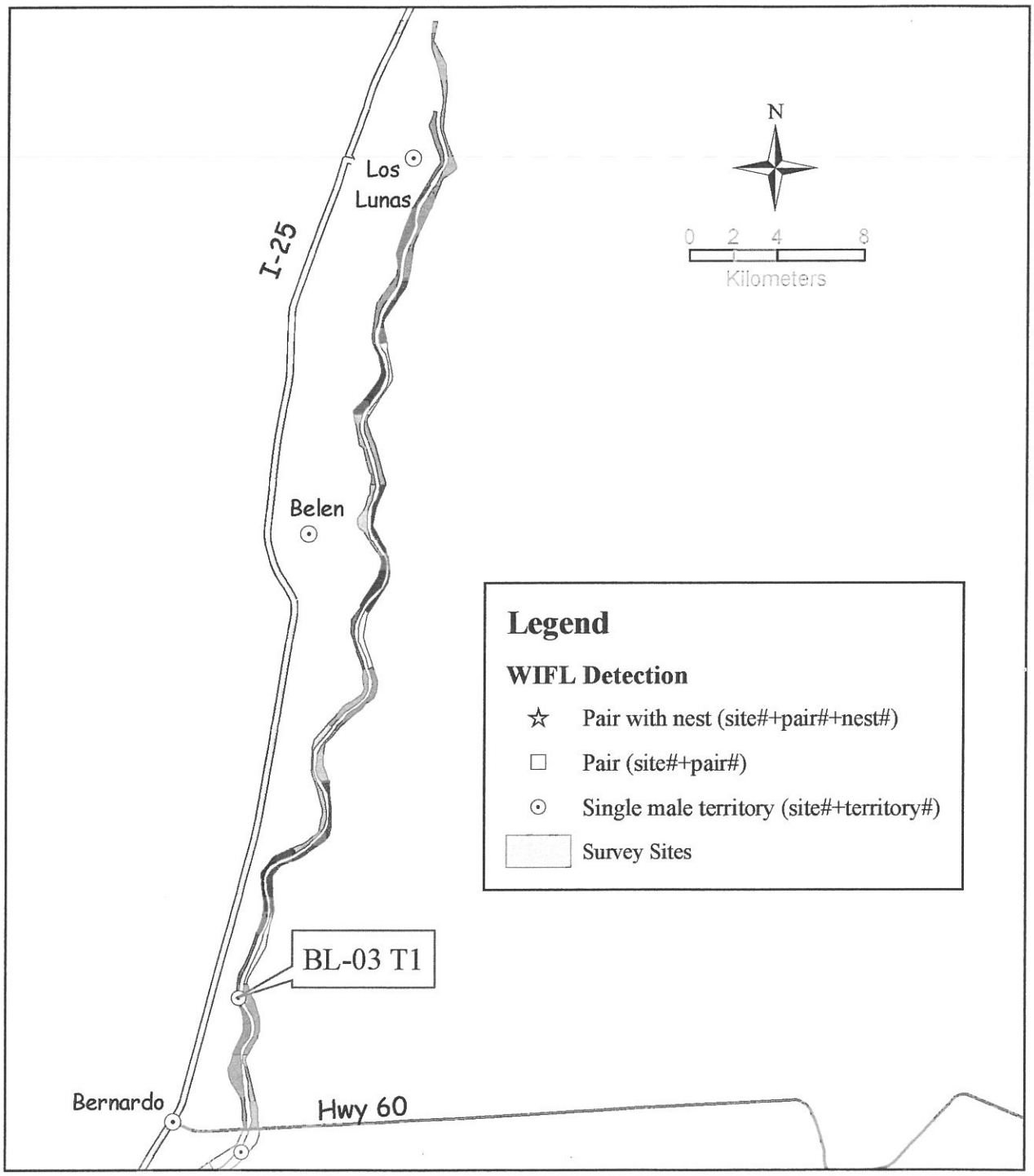

Figure 10. WIFL detections within the Belen reach – 2002.

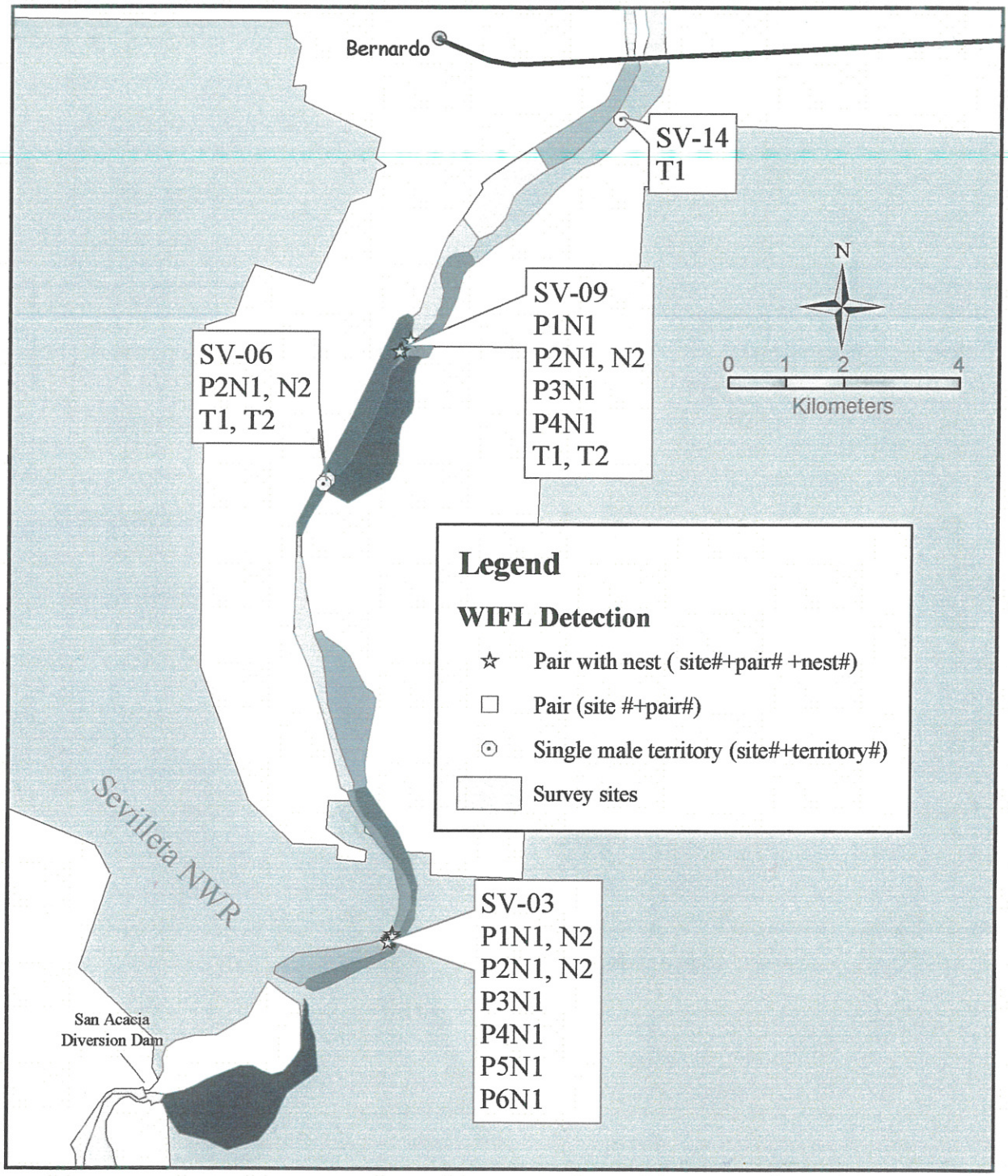

Figure 11. WIFL detections within the Sevilleta/ La Joya reach – 2002.

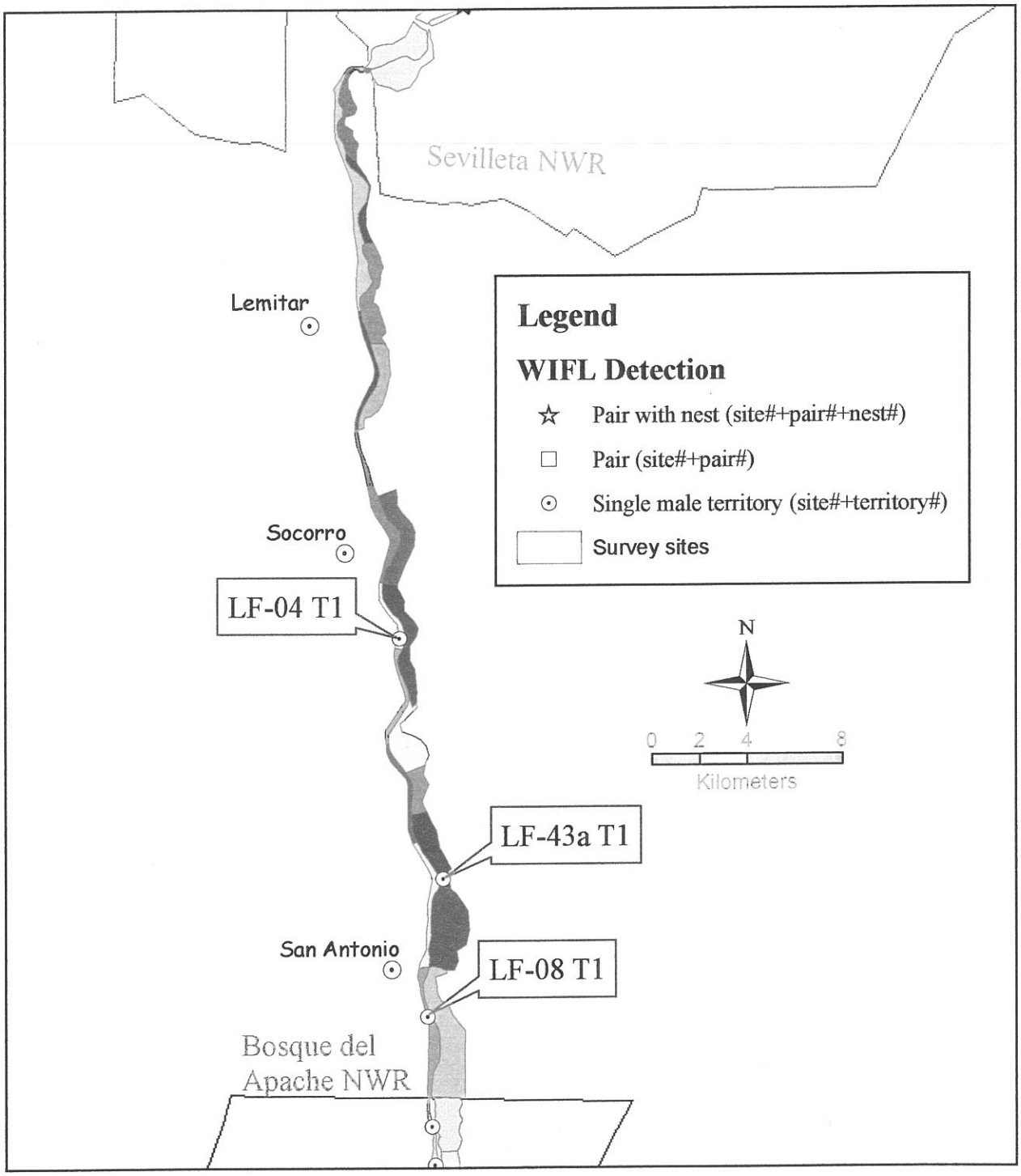

Figure 12. WIFL detections within the San Acacia to Bosque NWR reach – 2002.

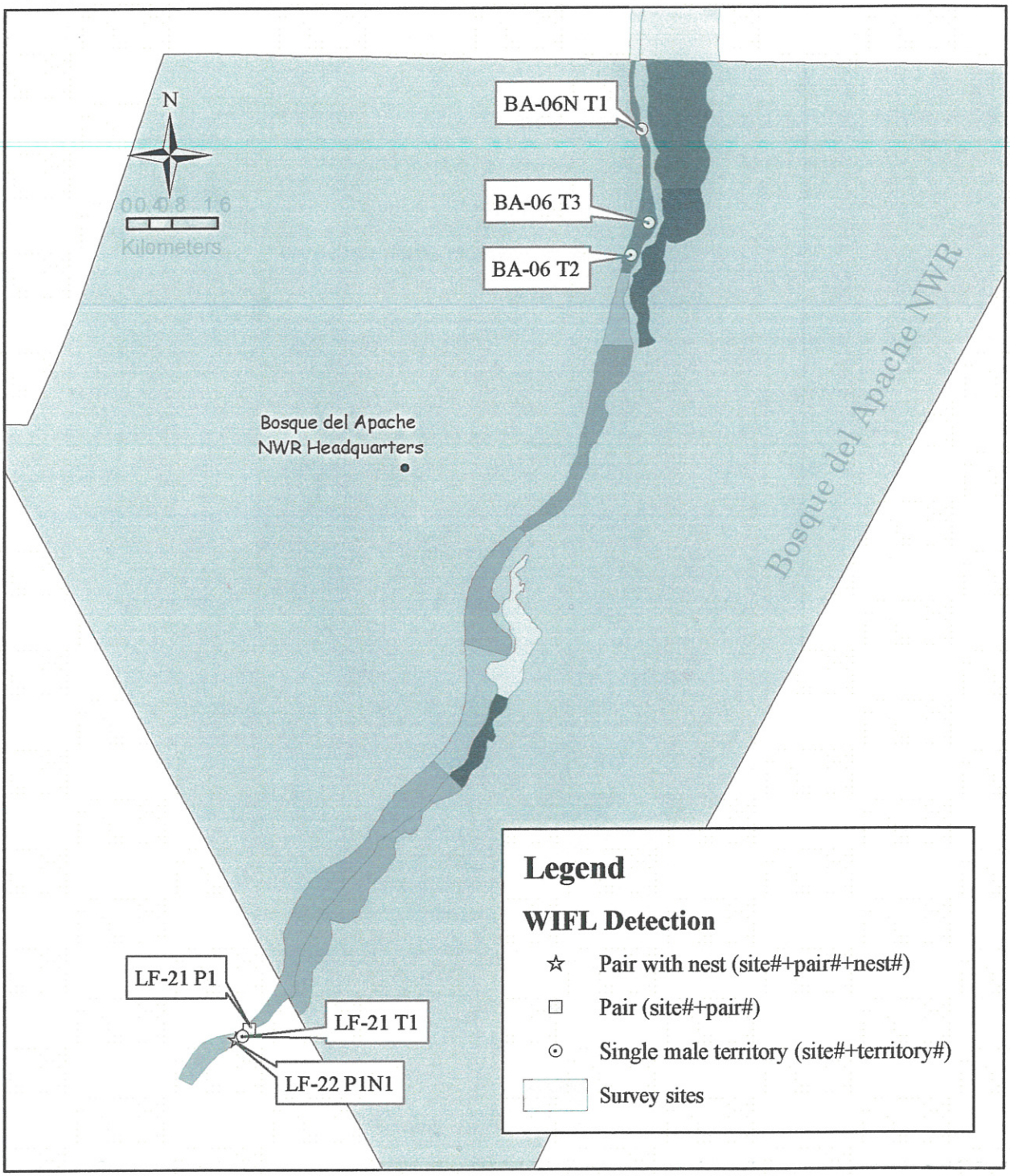

Figure 13. WIFL detections within the Bosque NWR reach – 2002.

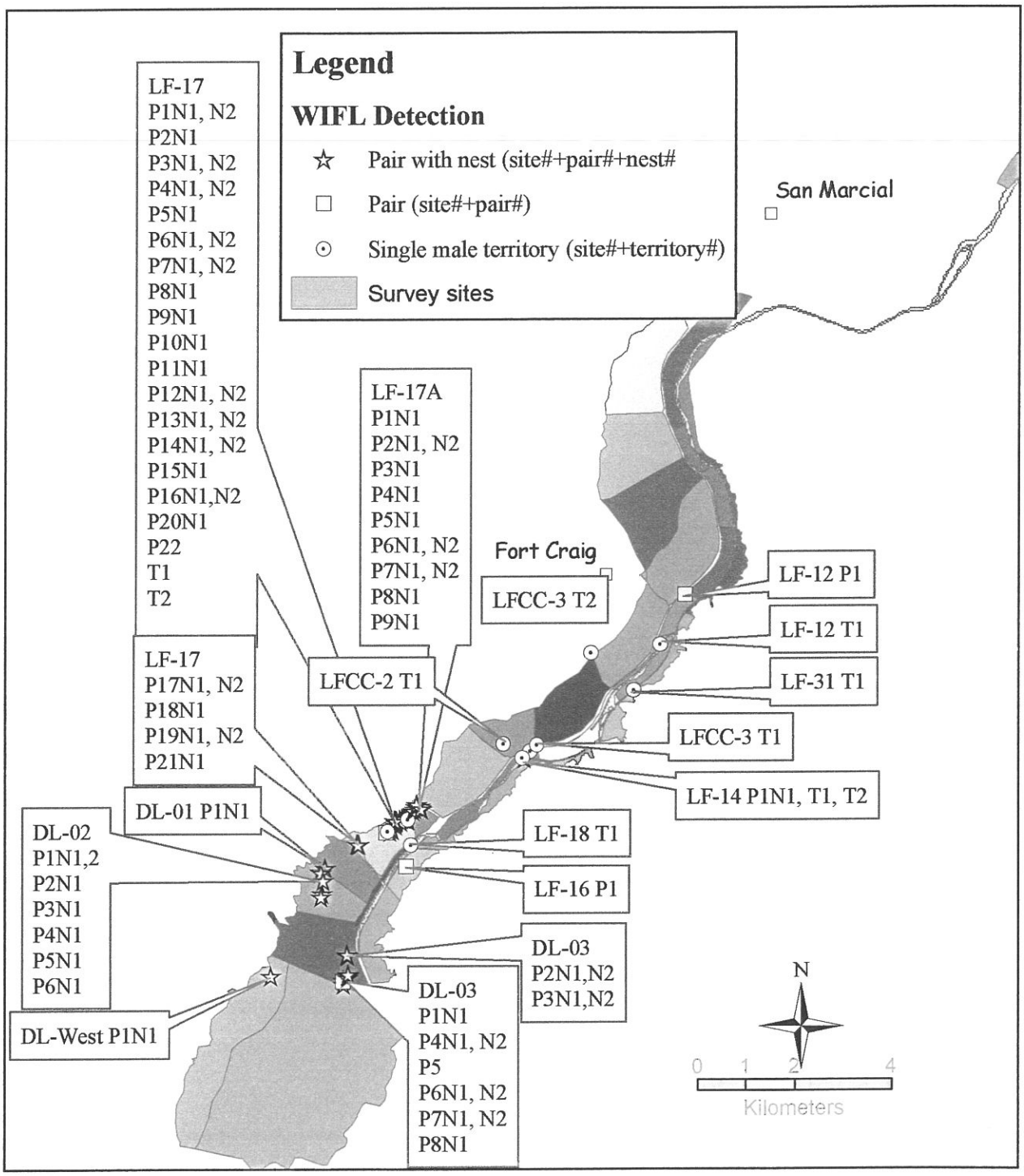

Figure 14. WIFL detections within the San Marcial reach – 2002.

During the 2002 season, five surveys were required in project related sites, which comprised approximately 40 percent of the sites surveyed. Within these 44 sites, 13 WIFLs (6 pairs and 1 lone male) were documented for the first time during the fourth or fifth surveys. Therefore, 88.7 percent of the WIFLs detected during the 2002 season were found within the first three survey periods. However, no new occupied WIFL sites were discovered in additional surveys. The additional surveys did, however, provide greater confidence to the absence of the species in unoccupied sites.

Presence/absence survey forms are presented in Appendix A. Willow Flycatcher Nest Site Data forms and Nest Record forms are presented in Appendix B. A summary of WIFL detections within the San Marcial reach from 1994 through 2002 is illustrated in Figure 15. Appendix C contains an overview of the 59 sites where WIFLs were detected during the 2002 season.

Species of Special Concern

No common ground-doves or yellow warblers were detected during the 2002 season. Results for the Belen reach are presented in Figure 16, the Sevilleta/La Joya reach is presented in Figure 17, the San Acacia to Bosque reach is presented in Figure 18, the Bosque del Apache NWR reach is presented in Figure 19, and the San Marcial reach is presented in Figure 20. These maps show a much higher density of special concern species in the Bosque del Apache Refuge than elsewhere. This is likely due to the increased presence of surveyors performing yellow-billed cuckoo surveys as well as greater bird identification skill possessed by those surveyors.

Nest Searches/Monitoring

In 2002, a total of 80 nests were monitored by Reclamation personnel in the Middle Rio Grande. Of these, 44 were successful and 36 failed. Fourteen nests were parasitized and BHCO eggs were removed from 8 of them. Of those, three fledged WIFL young (38 percent success) and five were subsequently predated. The following is a reach-by-reach and site-by-site summary of the WIFL nest monitoring efforts of 2002:

Belen reach

No nests were found in the Belen sites during the 2002 WIFL breeding season.

Sevilleta/ La Joya reach

WIFLs were first discovered during the 1999 WIFL breeding season. Unlike the native-dominated habitats which supported most other WIFL territories, this reach is dominated by exotic species (saltcedar and Russian olive). This reach supported 13 territories and 10 WIFL pairs during the 2002 season. Although only 12 nests were discovered, the presence of fledglings in a territory in SV-03 confirmed the presence of another nest, bringing the total to 13 nests. Eight nests were successful and five failed. Three re-nests and no second broods were documented. At least 16 young are believed to have successfully fledged from these nests. Although 3 of the 13 nesting attempts were parasitized, parasitism was the direct cause of only one nest failure: (1) one nest was parasitized and subsequently abandoned; (2) one nest was predated after parasitism; and (3) one nest successfully fledged WIFL chicks after removal of BHCO egg. See Appendix B for detailed nest site and nest monitoring data forms. The following is a site-by-site breakdown of all WIFL nesting in this reach during 2002:

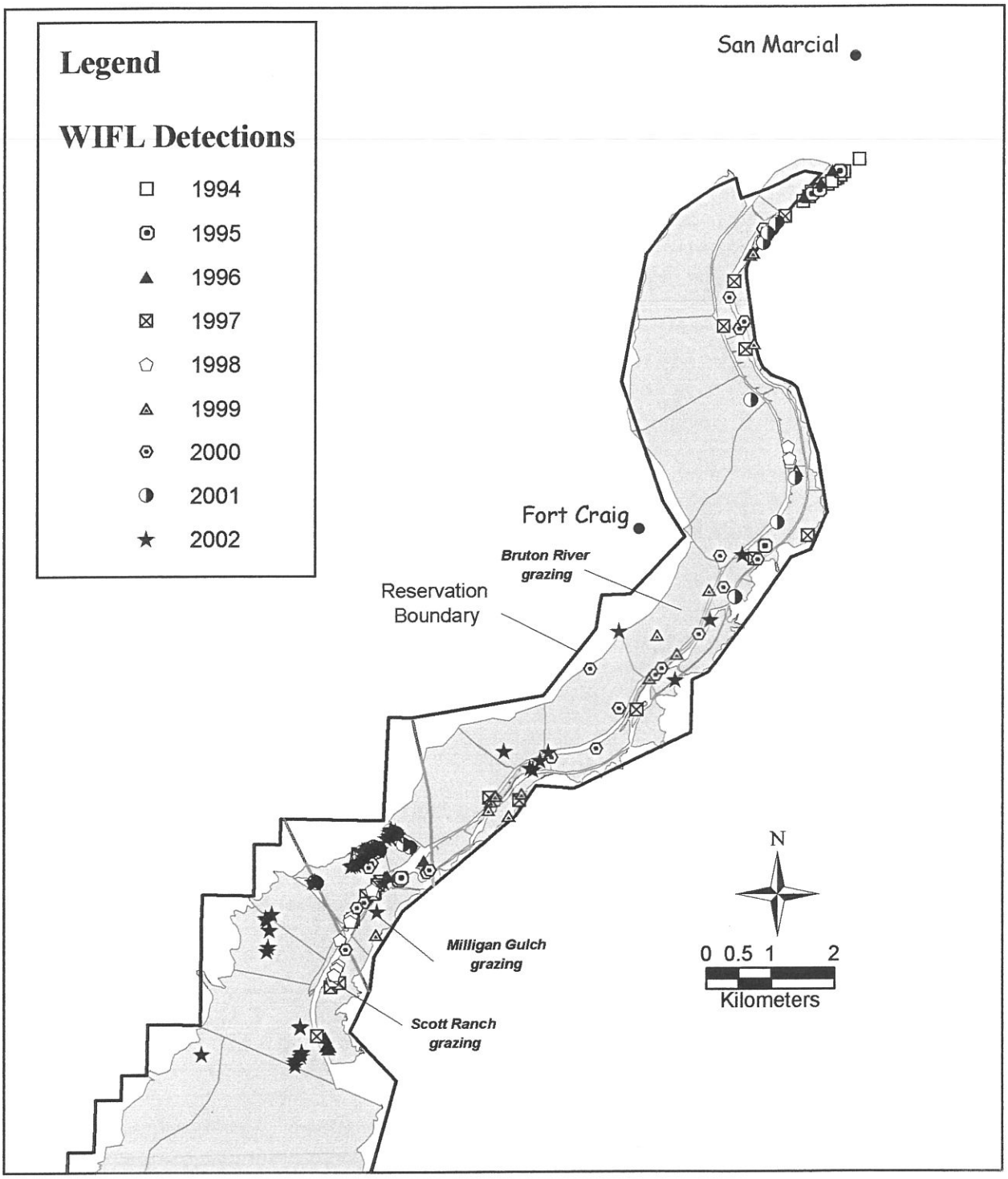

Figure 15. WIFL territories detected in the San Marcial reach – 1994 to 2002.

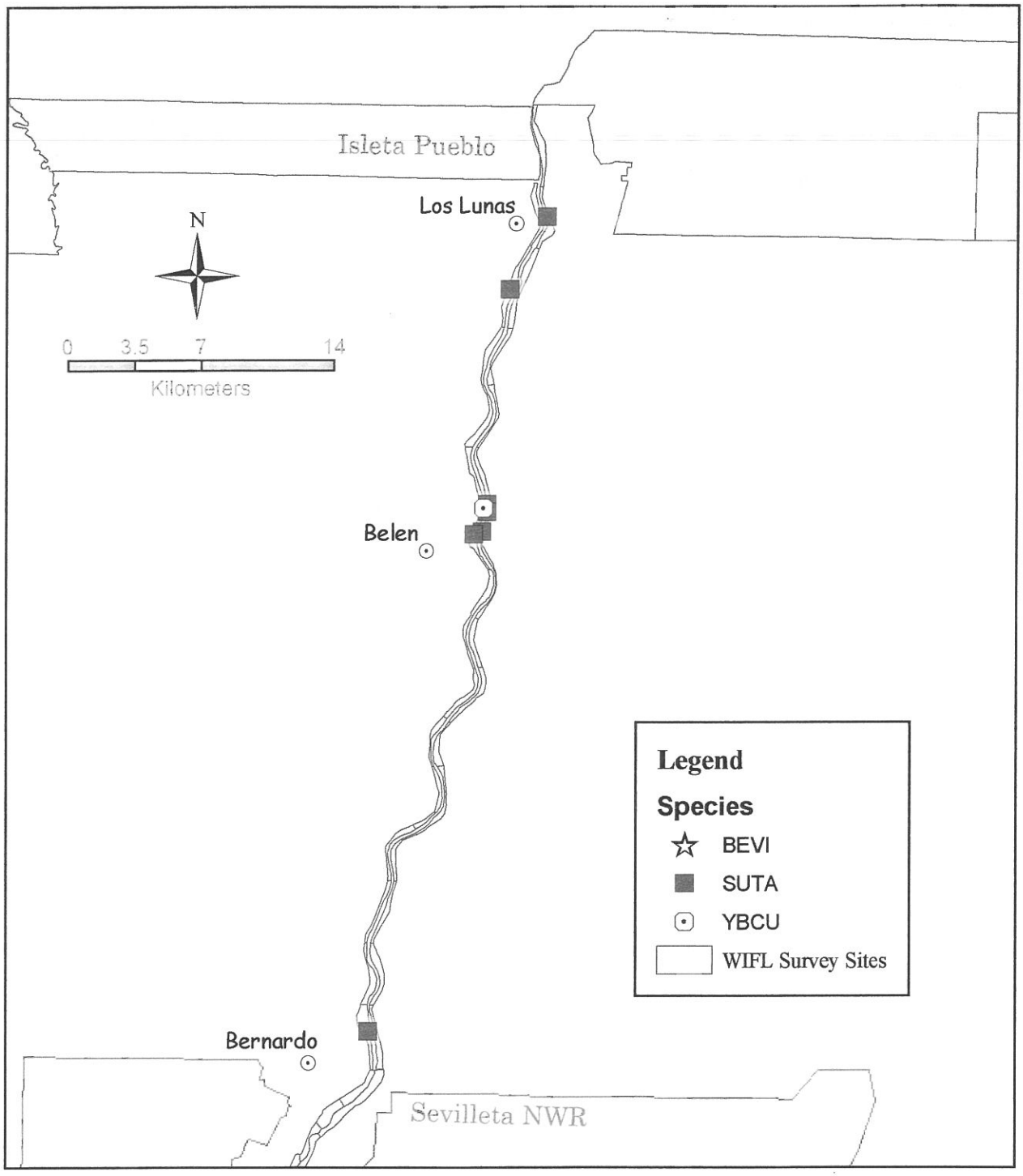

Figure 16. Species of concern occurrences – Belen reach – 2002.

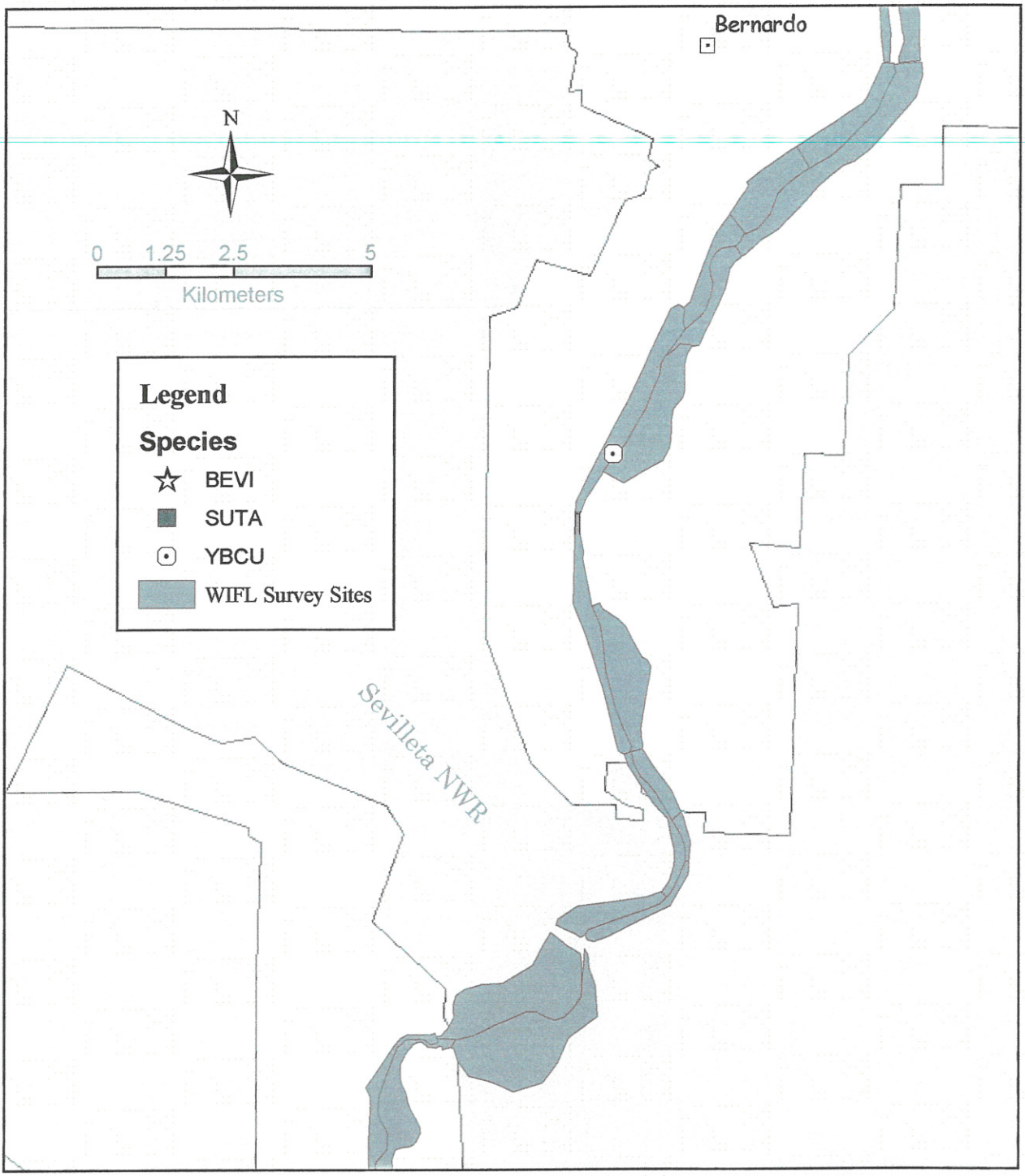

Figure 17. Species of concern occurrences – Sevilleta/La Joya reach – 2002.

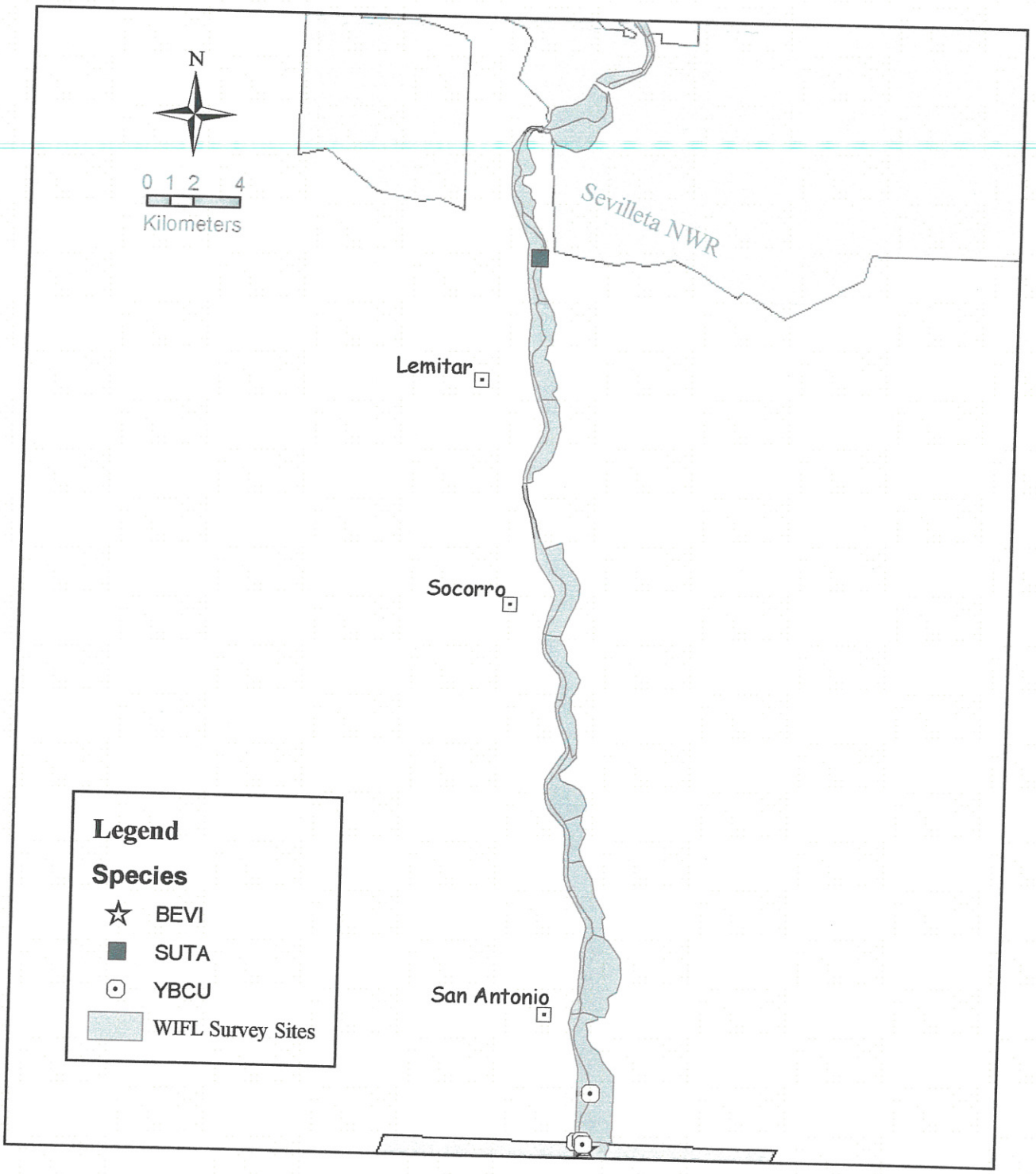

Figure 18. Species of concern occurrences – San Acacia to Bosque NWR reach – 2002.

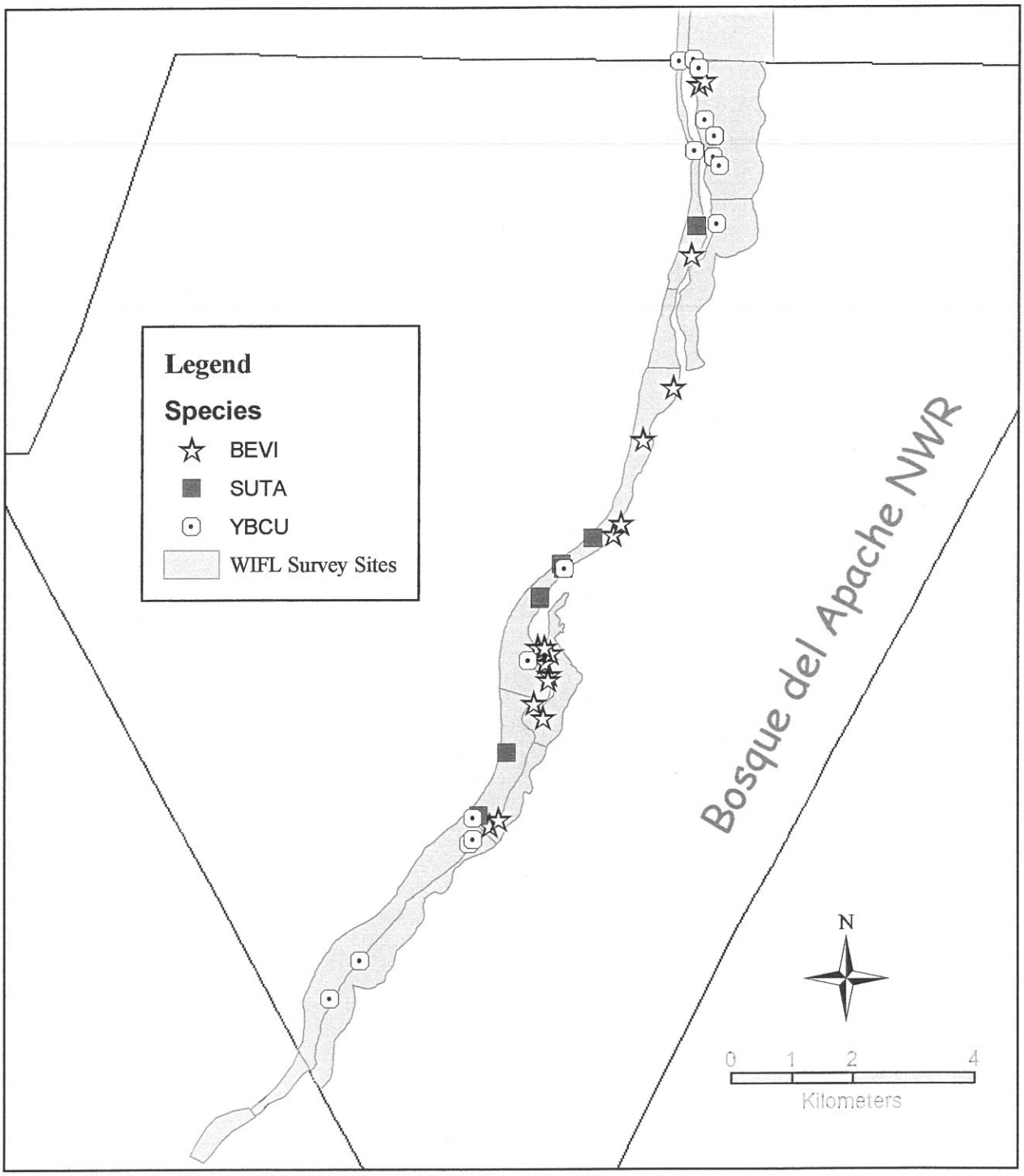

Figure 19. Species of concern occurrences – Bosque NWR reach – 2002.

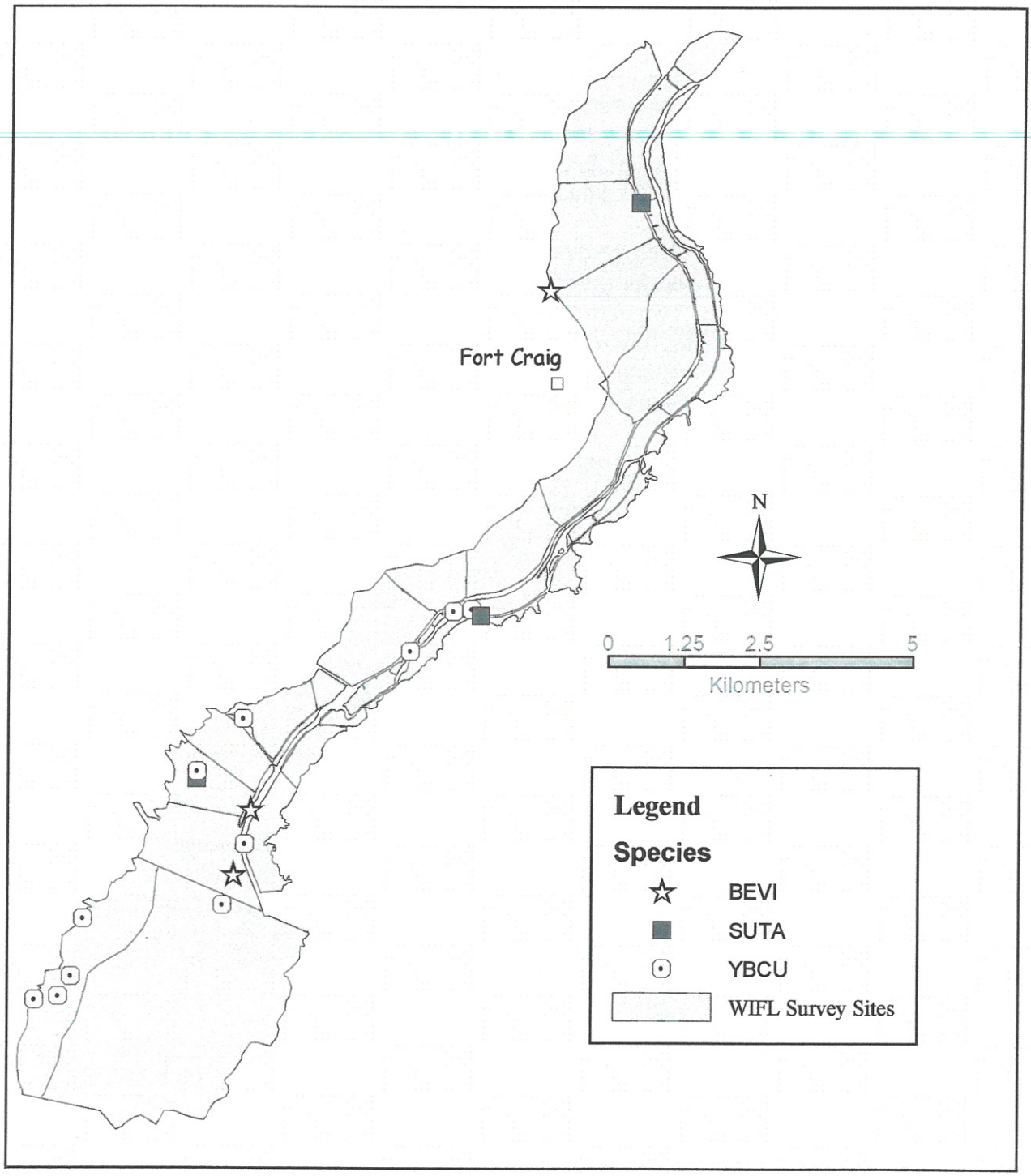

Figure 20. Species of concern occurrences – San Marcial reach – 2002.

SV-03 - Seven nests were discovered during the 2002 breeding season. The presence of one additional nest was confirmed in a territory (though this nest was not found) when fledglings were observed. Fledglings were confirmed for four of the nests (including one re-nest), one was assumed to be successful, and three (including one re-nest) failed. At least 10 young were assumed to have fledged from this site. Of the failed nests, two were predated and one was parasitized and subsequently abandoned. The earliest estimated hatch date was June 23, and the latest estimated fledge date was July 21. The re-nest attempts resulted in one successful nest and one BHCO parasitism and abandonment.

SV-09 - Five nests were discovered during the 2002 breeding season, including one re-nest. Fledglings were confirmed for the re-nest, two others were assumed to have successfully fledged, and two failed. Two of the nests were parasitized, one was subsequently predated, and the other fledged after removal of the BHCO egg. The other failed nest was predated also. At least six WIFL young were assumed to have fledged from this site. The earliest estimated hatch date was June 21, and the latest estimated fledge date was August 8.

San Acacia to Bosque del Apache reach
No nesting WIFLs were documented.

Bosque del Apache reach
No nesting WIFLs were documented.

San Marcial reach
A total of 52 pairs and 67 nests were found, including 14 re-nests and 6 second broods. Fledglings were confirmed for 9 nests, another 27 were assumed to have been successful, and the remaining 31 failed for various reasons. Of those that failed, 21 were predated, 5 were abandoned, 4 failed due to unknown reasons, and 1 contained infertile eggs or was abandoned prior to eggs hatching.

Eleven nests were parasitized. BHCO eggs were removed from six (four subsequently predated, two fledged), three were predated, one was abandoned, and one was built over by the adult WIFLs. At least 86 young were assumed to have fledged within this reach. See Appendix B for detailed nest site and nest monitoring data forms. The following is a site-by-site breakdown of nest monitoring efforts for each of the survey sites found in the San Marcial reach during the 2002 WIFL breeding season.

LF-14 – This site contained one nesting pair during the 2002 breeding season. The pair produced one nest and it was assumed to have successfully fledged one WIFL chick. It hatched on July 9 and fledged on approximately July 22.

LF-17 – This site contained 32 nests from 22 WIFL pairs, including 6 second broods and 5 re-nests. Fledged WIFLs were confirmed for 4 nests, another 17 nests were assumed to be

successful, and 11 failed. Of those that failed, eight were due to predation, one was abandoned prior to egg laying, one nest containing a dead 3-day-old chick was abandoned, and one nest failed due to unknown reasons. Four of the six second broods were successful, and two of the five re-nests were successful. Two nests were parasitized: both BHCO eggs were removed, one fledged, and one was subsequently predated. The earliest hatching date was June 9, and the latest fledge date was August 11. At least 58 WIFL chicks were assumed to have fledged from this site.

LF-17a – This site contained 12 WIFL nests from 9 pairs, including 3 re-nests. Fledgling was confirmed for two nests, one nest was assumed to have fledged, and nine nests failed. Failure was due to predation (six), unknown means (two), and one was abandoned after parasitism. Two of the re-nests were predated and the third fledged. Seven of the nests were parasitized. Of these, eggs were removed from four (three subsequently predated, one fledged), two were predated, and one was abandoned. The earliest hatch date for a nest was June 23, and the latest fledge date was July 29. At least four WIFL chicks were assumed to have fledged from this site.

LF-22 – This site contained one nesting pair that produced one nest. The nest was parasitized and was predated after the BHCO egg was removed.

DL-01 – This site contained one nesting pair that produced one nest. The nest was not parasitized and successfully fledged two WIFL chicks that were confirmed in the vegetation surrounding the nest. The WIFL eggs hatched on approximately July 16 and fledged on or around July 28.

DL-02 – This site contained seven WIFL nests from six nesting pairs; one was a re-nest. Fledglings were confirmed for one nest, three others were assumed to have successfully fledged, and two failed. Predation and abandonment/infertile eggs caused two failures. One nest was parasitized early in the construction of the nest, and the adults built over the BHCO egg. The earliest hatching date was approximately July 3, and the latest fledging date was August 23. At least 10 WIFLs were assumed to have fledged from this site.

DL-03 – This site contained 12 WIFL nests from 8 pairs, including 5 re-nests. One pair did not produce a nest or the nest was not found. Fledglings were confirmed for one nest, four were assumed successful, and seven failed. Of those that failed, three were predated, one was removed from the tree by unknown means, one was abandoned after partial predation, and two were abandoned prior to egg laying. No nests were parasitized. Four of the five re-nests were assumed successful, and the other was predated. The earliest hatching date was July 7 and the latest fledging date was August 7. Eleven WIFL chicks were assumed to have fledged out of this site.

DL-West – This site contained one nesting pair that produced one nest. The nest contained one egg when found on June 24 and was subsequently predated prior to next check.

DISCUSSION

Presence/Absence Surveys

Velarde reach

WIFL territories in the Velarde area of northern New Mexico, which include the La Canova, Garcia Acequia, and La Rinconada sites, have declined in recent years (Table 3). During the summer of 2002, no resident WIFLs were found in the entire Velarde reach. The fact that this population has declined to zero combined with the fact that other localized populations within the Sevilleta NWR/La Joya State Wildlife Area reach and San Marcial reach have increased in recent years suggests these sites are serving as "population sinks" and may warrant further study. These sites may be too small and isolated to support successful breeding populations.

Table 3. Reach-by-reach summary of WIFL territories in lands within the active flood plain of the Rio Grande surveyed by Reclamation between 1995 and 2002

	1995	1996	1997	1998	1999	2000	2001	2002
Velarde	6	4	5	2	2	2	1	0
Belen	N/A*	N/A	N/A	N/A	N/A	N/A	N/A	1
Sevilleta/ La Joya	N/A	N/A	N/A	N/A	4	8	11	13
San Acacia	n/a	0	0	0	0	0	0	4
Bosque del Apache	0	0	0	0	0	0	0	3
San Marcial**	3	13	10	11	12	23	25	60

*N/A = not surveyed

**In this table, San Marcial reach includes all sites downstream of the railroad bridge and some sites outside of the active flood plain.

The quality of habitat at these sites has not diminished noticeably in recent years, nor has the frequency and duration of overbank flood events. Actually, the density and structure of the vegetation are believed to have increased as a result of maturing stands of native coyote willow. It is likely that the frequency of failed nesting attempts in the past has greatly attributed to the apparent decline of territorial WIFLs in this area. The causes of nest failure are believed to be varied—ranging from severe thunderstorms to natural predation, brood parasitism, the fragmented nature of riparian habitat, and adjacent land use practices.

Belen reach

During the summer of 2002, sites in the Belen reach were surveyed for the first time as part of the ESA Collaborative Program in an effort to gain baseline status of WIFLs on Reclamation

project lands. Although eight migrant WIFLs were discovered, only one resident lone male was documented. This is a testament to the strict habitat requirements of WIFLs and presents a great opportunity for riparian restoration and monitoring.

Sevilleta/ La Joya reach

WIFLs in the La Joya/Sevilleta reach were first documented in 1999, and territory numbers have steadily increased since then (Table 3). During the 2002 season, the entire reach was again surveyed, and 13 territories, 10 pairs, and 13 nests were found. The fact that this population has not only persisted but expanded is of significant interest due to habitat quality of this reach. Decadent saltcedar and Russian olive dominate the majority of sites in this reach. Overbank flooding is very rare. However, the proximity to water, density and vertical stratification of vegetation, and scattered patches of native vegetation seem to make certain sites—LF-03 and LF-09 in particular—attractive to breeding WIFLs.

San Acacia to Bosque NWR reach

Resident WIFLs have never been documented in the San Acacia to Bosque NWR reach until the 2002 survey season. Four territories were documented, and it is likely that a majority of those were late migrants although they were treated as residents.

Bosque del Apache NWR reach

During 2002, flood plain habitat within the Bosque del Apache NWR along the Rio Grande River was surveyed in its entirety. A total of 20 WIFLs, including 3 resident territories, were documented. No pairing activity was observed.

San Marcial reach

In the San Marcial reach, WIFL surveys and nest monitoring have not been conducted on lands north of the railroad bridge since 1996, with the exception of two sites in 2002. In 1994 and 1995, the area immediately upstream from the railroad bridge supported 5 and 11 WIFL territories, respectively; 5 and 7 of these territories contained WIFL pairs in an area referred to as the Condo site (NMNHP 1994, NMNHP 1996). In 2002, three territories were documented in two sites upstream of the railroad bridge. Although surveys were conducted downstream from the railroad bridge to the delta of Elephant Butte Reservoir in 1994 and 1995, only three unpaired males were detected during the 1995 breeding season (Ahlers and White 1996), and none were detected during the 1994 breeding season (NMNHP 1994). Since 1995, WIFL territories below the railroad bridge have increased greatly (Tables 3 and 4). Territories are located mainly within the high quality habitat between sites LF-17a and DL-03, where the combination of hydrology and vegetation provide optimal habitat. It is likely that, as habitat matures within the delta of Elephant Butte Reservoir, this population will continue to expand. On the other hand, sites such as LF-27, that formerly supported WIFL territories but no longer

Table 4. Summary of southwestern willow flycatcher nest monitoring (1994-2002) - downstream of railroad bridge to Elephant Butte Reservoir delta

Year	# Territories	# Pairs	# Nests found	# Nests parasitized (%)	# Nests predated (%)	# Nests abandoned (%)	Unknown success	# Successful nests (%)	Estimated total # chicks fledged	Estimated productivity (# chicks per successful nest)
1994	0	0	0	N/A	N/A	N/A	N/A	N/A	0	N/A
1995	3	0	0	N/A	N/A	N/A	N/A	N/A	0	N/A
1996	13	1	1	0	0	1 (100%)	N/A	0	0	N/A
1997	10	3	2	0	0	0	0	2 (100%)	4	2.0
1998	11	4	2	0	0	0	0	2 (100%)	7	3.5
1999	12	5	5	1 (20%)*	1 (20%)*	1 (20%)*	0	4 (80%)	10	2.5
2000	23	20	19	2 (10%)*	1 (5%)	2 (10%)*	2	14 (74%)	29	2.1
2001	25	25	36	0	7 (19%)	2 (6%)	0	27 (75%)	79	2.9
2002	60	50	66	11 (17%)*	19 (29%)*	6 (9%)*	0	36 (55%)	≥86	2.4

*Some nests were parasitized, predated, and/or subsequently abandoned
** Some pairs re-nested after failed attempt or attempted a second brood

do, may currently be less attractive to WIFLs due to the lack of overbank flooding and the proximity of higher quality habitat in the delta area. A combination of lack of water and aging vegetation has caused these sites to lose the vertical stratification and density that is characteristic of high quality WIFL habitat and caused the WIFLs to move to more suitable areas.

Nest Searches/Monitoring

Belen reach

Since no pairing was observed in the one territory identified in this reach, searching for nesting was unwarranted.

Sevilleta/ La Joya reach

As previously mentioned, WIFLs were first documented in this reach in 1999, and it was first surveyed in its entirety during the 2000 season. Three, six, and nine nests were documented during the 1999, 2000, and 2001 breeding seasons, respectively (Table 5). During the 2002 survey season, 13 nests were documented. The fact that most nesting territories are characterized by exotic or mixed native and exotic vegetation, as opposed to the native vegetation characterizing most other nesting territories in the Middle Rio Grande, presents an interesting opportunity for data analysis (see **Middle Rio Grande as a whole** section).

Table 5. Reach-by-reach summary of WIFL nests in lands surveyed by Reclamation between 1995 and 2002

	1995	1996	1997	1998	1999	2000	2001	2002
Velarde	N/A*	2	6	3	1	2	0	0
Belen	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
Sevilleta/ La Joya	N/A	N/A	N/A	N/A	3	6	9	13
San Acacia	N/A	0	0	0	0	0	0	0
Bosque del Apache	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
San Marcial**	0	1	2	2	5	19	36	66

*N/A = not surveyed

**In this table, San Marcial reach includes all sites downstream of the railroad bridge

San Acacia to Bosque reach

No nesting attempts were documented in 2002.

Bosque del Apache NWR reach

No nesting attempts were documented during 2002.

San Marcial reach

In the 2002 survey season, 67 WIFL nests were documented, including 2 sites north of the railroad bridge. This indicates a significant increase over the past 6 years (Tables 3 and 5).

During the 2000 season, an apparent concentration of breeding WIFLs developed within the LF-17 and LF-17a sites. This concentration of WIFLs is likely a result of a consistent water supply provided by the Low Flow Conveyance Channel outfall and the emergence of maturing native vegetation within the receding headwater area of Elephant Butte Reservoir. This large patch of habitat allows the nesting WIFLs to escape predation and parasitism and has dramatically increased their population over the last four seasons.

In 1995, four of six (66 percent, n=6) WIFL nests discovered in the riparian area upstream of the railroad bridge had been parasitized by cowbirds (NMNHP 1995). Cowbird control efforts were implemented between 1996 and 2001 and only 3 of 65 nests (5 percent) downstream from the railroad bridge were parasitized. In addition, cattle were removed from public lands below the railroad bridge during the WIFL breeding season from 1997 through 2002. The removal of cattle during the WIFL breeding season was initiated to reduce the potential for brood parasitism by BHCOs which assumed to associate with cattle, and to limit physical disturbance to the occupied WIFL sites. Based on available data (Ahlers and Tisdale-Hein 2000), it is assumed that cattle may concentrate local BHCO populations, but may not actually increase localized BHCO

populations on the Middle Rio Grande. In 2002, no cowbird trapping was done, and the parasitism rate among San Marcial WIFL nests increased to 16 percent (n=67). This would seem to imply that cowbird trapping is effective at reducing parasitism rates. However, with so many environmental variables involved, such as the removal of cattle during the breeding season, it is difficult to determine if the reduction in parasitism levels can solely be attributed to cowbird trapping or if the increase in parasitism is a factor of simple annual variability. The WIFL recovery plan (USFWS 2001) states that "cowbird control should be considered if parasitism exceeds 20 to 30 percent after collection of 2 or more years of baseline data."

Overall, during the 1999 to 2002 breeding seasons, 127 nests have been discovered in this reach, making it the second most productive WIFL breeding area in the state of New Mexico and the largest source population on the Middle Rio Grande. This holds special implications for the population as a whole. Strict and careful nest monitoring of this population needs to be done to detect and potentially counteract any significant increases in nest failure, cowbird parasitism, or any other variable detrimental to the survival of this population.

Middle Rio Grande as a whole

Over the past 4 years, 156 WIFL nests have been monitored in the Middle Rio Grande. Table 6 outlines the following comparisons. Nineteen nests (12.2 percent) were in saltcedar dominated territories, 119 (76.3 percent) were in *Salix* dominated territories, and 18 (11.5 percent) were in mixed dominance territories. Saltcedar and *Salix* dominated territories are greater than 90 percent saltcedar or *Salix*, respectively. Mixed dominance occurs when there is no clearly dominant vegetation. In terms of nest success, it does not appear that nests in *Salix* dominated territories (65.8 percent, n=117) are more successful at fledging offspring than those in saltcedar (63.2 percent, n=19) or mixed habitat (52.9 percent, n=17). On the other hand, nests in saltcedar (31.6 percent, n=19) or mixed dominance (35.3 percent, n=17) territories do appear to be more likely to be parasitized than those in *Salix* dominated territories (8.5 percent, n=117). Also, productivity (number of fledged young per successful nest) appears to be less in exotic and mixed dominance territories (1.37 and 1.12, respectively) than in *Salix* (1.68). Thus, it seems that although WIFLs can nest successfully in saltcedar and mixed habitats, these habitats do not support their nesting effort as well as *Salix* dominated habitats.

These data are very interesting when considering nest substrate. Nest substrate is defined as the species of tree where the nest is physically located. Although 76.3 percent of WIFL nests over the past 4 years were in *Salix* dominated territories, 45.5 percent of all nests and 34.5 percent of nests in *Salix* dominated territories were in saltcedar substrate. Once again, nest success is similar in three different substrate categories: 67.9 percent, 62.3 percent, and 66.6 percent in *Salix*, saltcedar, and Russian olive, respectively. However, parasitism seems to increase in exotic substrates (9.0 percent in *Salix* substrate compared to 20.0 percent and 33.3 percent in saltcedar and Russian olive substrates, respectively). Similarly, productivity of WIFL nests in *Salix* substrate (1.81) appears to be greater than in saltcedar substrate (1.33). See Appendix D for current WIFL habitat suitability model.

Table 6. Habitat comparison of WIFL nesting within the Middle Rio Grande – 1999 to 2002

Territory Vegetation Type		
Number of nests in saltcedar dominated territories	19	12.2% of total
Number of nests in *Salix* sp. dominated territories	119	76.3% of total
Number of nests in mixed dominance territories	18	11.5% of total
Nest Substrate Species		
Number of nests in *Salix* sp. Substrate	79	50.7% of total
Number of nests in saltcedar substrate	71	45.5% of total
Number of nests in Russian olive substrate	6	3.8% of total
Nest Substrate/Territory Vegetation Combination		
Number of nests in saltcedar substrate within *Salix* sp. dominated territories	41	(34.5% of 119 nests)
Number of nests in *Salix* sp. substrate within saltcedar or mixed dominated territories	1	(2.6% of 37 nests)
Nest Success Per Nest Substrate Species		
Percentage of successful nests in *Salix* sp. Substrate	67.9%	(53 out of 78 nests successful)
Percentage of successful nests in saltcedar substrate	62.3%	(43 out of 69 nests successful)
Percentage of successful nests in Russian olive substrate.	66.6%	(4 out of 6 nests successful)
Nest Success Per Territory Vegetation Type		
Percentage of successful nests in *Salix* sp. Dominated territories	65.8%	(77 out of 117 nests successful)
Percentage of successful nests in saltcedar dominated territories	63.2%	(12 out of 19 nests successful)
Percentage of successful nests in mixed dominance territories	52.9%	(9 out of 17 nests successful)
Cowbird Parasitism Per Nest Substrate Species		
Percentage of nests parasitized in *Salix* sp. substrate	9.0%	(7 out of 78 nests parasitized)
Percentage of nests parasitized in saltcedar substrate	20.0%	(13 out of 65 nests parasitized)
Percentage of nests parasitized in Russian olive substrate	33.3%	(2 out of 6 nests parasitized)
Cowbird Parasitism Per Territory Vegetation Type		
Percentage of nests parasitized in *Salix* sp. dominated territories	8.5%	(10 out of 117 nests parasitized)
Percentage of nests parasitized in saltcedar dominated territories	31.6%	(6 out of 19 nests parasitized)
Percentage of nests parasitized in mixed dominance territories	35.3%	(6 out of 17 nests parasitized)
Productivity Per Territory Vegetation Type		
Productivity(1) of all nests (n=117) found in *Salix* sp. dominated territories	1.68/nest	(197 young from 117 nests)
Productivity of all nests (n=19) found in saltcedar dominated territories	1.37/nest	(26 young from 19 nests)
Productivity of all nests (n=17) found in mixed dominance territories	1.12/nest	(19 young from 17 nests)
Productivity Per Nest Substrate Species		
Productivity of all nests (n=78) found in *Salix* sp. substrate	1.78/nest	(139 young from 78 nests)
Productivity of all nests (n=69) found in saltcedar substrate	1.38/nest	(95 young from 69 nests)
Productivity of all nests (n=6) found in Russian olive substrate	1.33/nest	(8 young from 6 nests)
Productivity Compared to Nest Substrate Species and Territory Vegetation Type		
Productivity of nests in Salix substrate within *Salix* sp. dominated territories	1.81/nest	(139 young from 77 nests)
Productivity of nests in saltcedar substrate within *Salix* sp. dominated territories	1.45/nest	(58 young from 40 nests)
Productivity of nests in saltcedar substrate within saltcedar dominated territories	1.37/nest	(26 young from 19 nests)
Total WIFL nests monitored	**156**	

(1) Productivity is defined as the number of WIFL young fledged per successful nest.

When comparing 4 years of nesting data from the two primary nesting reaches within the Middle Rio Grande, one factor becomes apparent. The rate of parasitism within the Sevilleta/ La Joya reach (30.0 percent, n=30) is greater than that experienced by nesting WIFLs within the San Marcial reach (10.0 percent, n=130). Nest data for other riparian obligate neotropical songbirds were not collected within this reach for comparison to WIFL nest data. However, the mean number of female cowbirds detected along established point count transects was collected and can be compared within the adjacent reaches of the Rio Grande River. Either-sex cowbird densities and female cowbird densities between 1999 and 2002 were 3 to 3.5 times greater within the Sevilleta/La Joya reach than within the San Marcial reach. The Sevilleta/La Joya reach supported the greatest density of female cowbirds compared to all other monitored reaches within the Middle Rio Grande Basin and this could be responsible for the increased parasitism rate.

Lastly, in coordination with USFWS, removal of BHCO eggs from parasitized WIFL nests is a practice that was begun in 2002. Of the 14 WIFL nests parasitized, BHCO eggs were removed from 8 of them, 3 of which successfully fledged WIFL young (38 percent success). Parasitized nests over the past six seasons in the Middle Rio Grande that were allowed to follow a natural course were not as successful. Sixteen nests were monitored—13 failed, 2 successfully fledged young, and 1 BHCO egg was built over by the adult WIFLs and subsequently fledged—a 19 percent success rate.

RECOMMENDATIONS

Recommendations for future work in the Middle Rio Grande fall under two categories:

1. Annual surveys of WIFL population concentrations
2. Periodic surveys of potential/unoccupied suitable habitat or restoration sites.

Annual Surveys

- Presence/absence surveys should continue in the occupied reaches of the Middle Rio Grande, such as the Sevilleta/La Joya and San Marcial reaches, to monitor the status of the WIFL population. These surveys will provide data regarding population trends and colonization of new sites adjacent to occupied sites.

- Presence/absence surveys should continue in Reclamation project-related areas where ESA compliance mandates.

- Nest monitoring should continue in areas where pairing activity is documented. These data will provide insight into factors limiting recruitment and population growth such as parasitism and predation rates.

- Removal of BHCO eggs from parasitized WIFL nests should continue, provided removal can be done with minimal disturbance to the nest and the adult WIFLs.

- Further data need to be gathered regarding the microhabitat characteristics that make various sites attractive or unattractive to nesting WIFLs. In particular, sites where WIFL populations are declining should be studied to determine the factors limiting successful recruitment. Sites where populations are stable or increasing should be studied to determine the habitat characteristics that make these areas productive.

- Efforts should be made to access areas previously unsurveyed to grasp the total population of WIFLs within occupied reaches.

- Lastly, where possible in relation to Reclamation projects, habitat modification and water management should be implemented in areas where populations are declining to attempt to bring the habitat back to its former productive state.

Periodic Surveys

- Periodic surveys should be performed in all unoccupied reaches in the Middle Rio Grande to document any colonization of newly suitable habitat.

- In any sites where resident WIFLs are documented, nest searching and monitoring should be conducted.

- The value of documenting the occurrence of neotropical migrants of special concern should be assessed on an annual basis. If this information continues to be of value to resource managers, the occurrence of these species should be documented concurrent with the presence/absence surveys for the WIFL.

- Habitat monitoring should be conducted at any restoration sites to document the effectiveness of various restoration practices.

CONCLUSION

Presence/absence data will be beneficial when establishing a realistic long-term monitoring plan and will aid in a better understanding of the species distribution, abundance, and potential threats. All available data will prove beneficial in the implementation of the Southwestern Willow Flycatcher Recovery Plan. As defined by the Recovery Plan for the Southwestern Willow Flycatcher (USFWS 2001), the Middle Rio Grande extends from Cochiti Reservoir to Elephant Butte Dam. The recovery goal for this reach is 100 WIFL territories. In the 2002 survey, 84 territories were documented: 1 in the Belen reach, 13 in the Sevilleta/ La Joya reach, 4 in the San Acacia reach, 3 in the Bosque reach, and 63 in the San Marcial reach. If territories likely to occur on the Isleta Pueblo (14 documented in 2000) (NMNHP 2000) and unsurveyed areas between the San Marcial railroad bridge and the Bosque del Apache NWR are added to this total, it is likely that the recovery goal for the Middle Rio Grande has already been achieved.

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